

HANDBOOK

OF
CARDENING
FOR

NEW ZEALAND



M. MURPHY, F.L.S.

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HANDBOOK
OF
GARDENING FOR NEW ZEALAND
WITH CHAPTERS ON
POULTRY & BEE-KEEPING

BY
M. MURPHY, F.L.S.

*Secretary Canterbury Agricultural and Pastoral Association, and Editor
of "New Zealand Country Journal," &c., &c.*



"MORAL OF THE GARDEN.—Nothing teaches patience like a garden. All have to wait for the fruit of the earth. You may go round and watch the opening bud from day to day, but it takes its own time, and you cannot urge it on faster than it will. If forced, it is only torn to pieces. All the best results of a garden, like those of life, are slowly but regularly progressive. Each year does a work that nothing but a year can do. 'Learn to labour and to wait' is one of the best lessons of a garden. All that is good takes time, and comes only by growth."

THIRD EDITION.

ENLARGED AND PARTLY RE-WRITTEN.

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PREFACE TO THE FIRST EDITION.

IN compiling this little work on "Gardening in New Zealand" an attempt has been made to collect the greatest amount of useful information which *could* be condensed within its limits, at the same time rendering such information as full and practicable as possible, so that the most inexperienced may with its assistance carry on the various operations of the several departments of the garden with every prospect of success. I do not claim much originality for the work, except in so far as my own experience, extending over many years in the Old Country and in the Colonies, enables me to determine the difference between the Home seasons and those of this country. Although we are at the antipodes of England, it does not follow that the seasons are exactly opposite. In New Zealand the growing season extends over a period of nine months, while in England it may be said not to exceed seven months.

Up to the present time no attempt has been made to produce a comprehensive manual of Gardening suitable to our requirements. It is true that calendars abound, and weekly instructions, but these fragmentary efforts (good so far as they go) do not enter sufficiently into details to be of much service to those persons who know little of the subject, but who, nevertheless, take pleasure in the growth of flowers, fruit, and vegetables. Much of the information embraced in the chapters of this work has been gleaned from the best authorities on the subjects treated of. I desire particularly to acknowledge my obligations in this matter to the editors of those excellent works entitled "Manuals for the Many," and Thomson's "Gardener's Assistant," Miss Omerod's "Injurious Insects," Loudon's "Encyclopædia," and others of like character. The extract matter has been thoroughly sifted, and only those portions have been chosen which from my own observations have convinced me of their suitability for New Zealand. It has not been found convenient to place within quotation marks the passages selected from the above works, because they have been altered and modified in important particulars to suit New Zealand seasons, but where the language of these authors has been found applicable, I have not hesitated to use it freely. I desire also to acknowledge my obligations to Mr. Thos. Turner, of

Christchurch, a gardener of many years' experience, who has rendered me much valuable assistance in reading and correcting the proofs of this work.

The premier position in the arrangement of the matter has been allotted to the Vegetable Garden. It is, unfortunately, a notable fact that vegetable growing is much neglected by the large majority of small farmers. Cheap bread and cheap meat, with an abundance of potatoes, seem to satisfy most of those engaged in rural pursuits. It is an accepted theory that a diet consisting mainly of animal food is not conducive to good health, particularly in the case of children. Radishes, mustard and cress, lettuce, and spinach are all easily grown, and as purifiers of the blood cannot be surpassed in the early Spring. The latter vegetable is so highly esteemed by the French for such purposes, that it is called by them the "Broom of the Stomach." All that is required in the culture of vegetables is deep tillage, plenty of manure, and secure fencing, coupled with a practical knowledge of the subject. One quarter of an acre, well managed, would provide a large family all the year round with an ample supply of wholesome vegetables.

PREFACE TO THE SECOND EDITION.

THE first edition of this Manual of Gardening having sold out, and a favourable reception having been accorded it by the public of New Zealand, the author has been encouraged to present a second edition, which has been carefully revised and enlarged. Suggestions kindly offered by experts and others have been acted upon where practicable. A large addition has been made to the directions for selecting, planting, and for the general management of fruit trees. Wherever instructions in other sections of the work were not considered sufficiently explicit the defect has been remedied. Instructions for Fern Growing have been enlarged upon by request. A chapter on Orange Culture has been added ; also one on miscellaneous subjects, which embraces a large amount of useful information, including a chapter on Fowl Keeping.

Persons residing north of Napier, or in Australia, who may wish to consult the pages of this Manual, will do well to remember that the seasons in the parts referred to are quite one month in advance of the South Island of New Zealand, and allowances must accordingly be made.

PREFACE TO THE THIRD EDITION

THE very favourable reception which has been accorded by the public to the first and second edition of "Gardening in New Zealand" and a general demand for a revised edition have encouraged the Author to undertake another issue, which is now presented to the gardening public.

The book has been carefully revised and enlarged, and for the most part re-written; fuller details have been given in the various operations of the garden, greenhouse, orchard, etc., which it is hoped will make the work more generally useful, especially to amateurs.

Persons residing north of Napier are again reminded that the seasons in those districts are quite one month in advance of those of the South Island of New Zealand. The time recommended for sowing, planting, etc., is that which has been found most suitable in the Canterbury district, and allowances must therefore be made for districts north or south.

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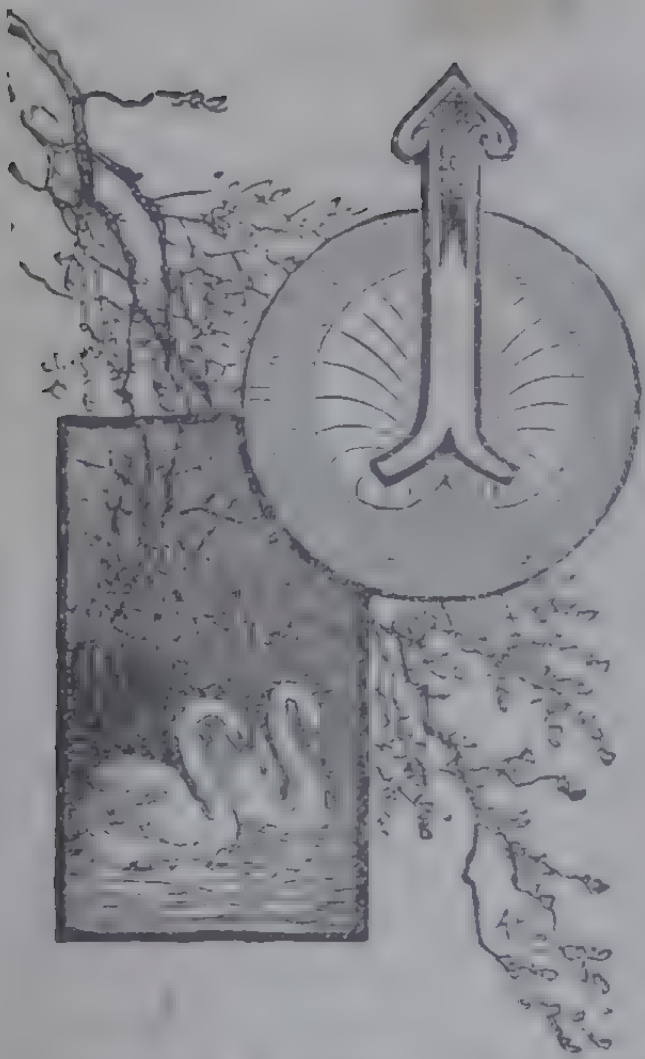
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GARDEN CALENDAR.



IN the preface to this work the value of vegetables as an article of diet has been pointed out. It is, therefore, of the first importance that every homestead should have a piece of ground devoted to this purpose, which should be free from trees of any kind. Vegetables should not be grown between the rows of fruit trees, after the latter have attained to three years' growth, for the following reasons:—Vegetables to be of the best quality

require a free circulation of sun and air; they also require that the soil should be frequently manured and deeply dug. This treatment, while absolutely necessary for the successful growth of vegetables, would be detrimental to the well-being of fruit trees, which require that an active growth of surface roots should be encouraged. This is impossible when the spade has to be used. Many promising young fruit trees are destroyed in this way. In cropping a garden some attempt should be made to carry out a system of rotation, by which is meant that cabbages should not follow immediately after plants of the same order—the crop should

be varied as much as is practicable. Having selected a piece of land, the first thing will be to trench it two or three feet deep, according as the nature of the soil will admit. Proceed in the following manner:—Open a trench across one end (the lowest if there is a fall) three feet wide, remove the top spit say for nine inches deep, and wheel or cart the soil to the end of the plot where it is proposed to finish the work; loosen well the remainder of the soil, adding an abundance of manure. This done, mark off another trench the same width as the last; throw the surface soil into the first trench, level off, manure and loosen the bottom soil as before, taking care not to throw much of the subsoil on to the surface. Continue in this manner until the end of the plot is reached; finish off the last trench with the surface taken from the first opening. This kind of trenching is known as Bastard trenching, and is the best for most soils. Trenching should be done as early in Autumn as possible, in order that the soil may get the benefit of the Winter frosts. Trenching the ground, however, will be labour thrown away if the subsoil is naturally wet; where water lodges thorough drainage must first be resorted to. Having said so much about trenching as the best means of preparing a piece of land for a vegetable garden, we may add that trenching is not absolutely necessary where the soil is moderately fertile. Good results will be achieved by deep digging, loosening the subsoil at the same operation; the deeper the soil, the longer will it retain the Winter and Spring rains, to be given up during the parching weather in the Spring and early Summer.

The following is a general calendar of work to be done in the Vegetable, Flower, and Fruit Gardens throughout the year, commencing with July. Detailed instructions will be found under the separate headings of Vegetable, Fruit, and Flower Gardens.

* JULY (corresponds with January in Britain).

Some authors recommend the sowing of a variety of garden seeds in July. Our own experience is, that except

*Amateurs residing in the North Island, who may use this little manual as a guide, will bear in mind that the seasons north of Napier are a month in advance of the South Island.

in the North Island, or in dry and well-sheltered localities, it is better practice not to commence sowing vegetable seeds till the end of August. The principal work for July will be the trenching—in dry weather—of the ground for the reception of seeds in August and September. Finish planting all kinds of fruit trees when the soil is sufficiently dry. Finish pruning all kinds of fruit trees, following the instructions given under the head of “Pruning.” If fowls are kept, it will be well to let them have the run of the garden for a few hours of each dry afternoon during this month. They will do good service in clearing the ground of grubs, woodlice, and a host of other pests. When planting and sowing commence they must be confined to their runs.

AUGUST.

Kitchen Garden.—Although August is the first month of Spring, Spring work does not really commence till towards the end of the month or beginning of September. In dry warm situations, two or three sowings of peas and broad beans should be made. A few potatoes of the very earliest sorts such as may be tried on the north side of a hedge or fence. A few early cabbages may now be planted out, and small sowings of the whole of the tribe should be made in sheltered situations. Quarter of an ounce of each will furnish plants to stock a large garden. The seed beds will however require protection from the birds. Celery may be sown in a frame or under a handlight. Onions should be sown on the ground prepared in the Autumn; sow in drills twelve inches apart and very shallow, so that the seed will be nicely covered, and no more; after covering up, tread the whole of the bed gently but firmly with your feet, then rake lightly, and the job is finished. Leeks may also be sown in drills thirty inches apart to allow of digging and earthing up the plants as they grow. Or young plants may be transplanted—the former is, however, the simplest plan. A good breadth of parsnips should now be sown in rich, light soil, in drills eighteen inches apart, the plants to be thinned out to six inches. All kinds of salads may be

sown in such quantities as are likely to be required. These operations can only be carried out with advantage in dry situations. Jerusalem artichokes may now be planted in rows three feet apart ; and two feet apart in the rows, planted four inches deep. Asparagus beds, if not already attended to, should be top-dressed with well-rotted manure.

Flower Garden.—Advantage should be taken of dry open weather for making necessary alterations in the form of the garden. This is a good time to remove the old exhausted soil from flower beds, to be replaced with fresh material, if procurable from old pasture land the soil may, however, be greatly improved by a top-dressing of old rotten manure dug in in the Autumn, or laid on the surface to be washed in by the winter rains. A little fine bone dust will be of service. Pruning and transplanting shrubs should now be completed. Some of the hardiest annuals may be sown in warm parts of the garden towards the end of the month. Herbaceous plants may be divided with advantage, and the mixed flower borders may be much improved by careful digging over and working in a liberal supply of old manure or fresh soil. Lawns may be formed, by sowing or turfing, and old ones should be carefully mown as required, and any bad places turfed over. March and April is the best time to lay down new lawns.

Bulbs.—Crown imperials, lilies, hyacinths, ixias, narcissus, gladioli, and tulips may still be planted, always selecting a time when the ground is dry ; a little sand put about the bulbs will be of service. Anemones and ranunculuses may also be planted, they thrive best in a rich sandy loam. Amateurs will find it more advantageous to leave these bulbs in the soil for two or three years without lifting—and only then for the purpose of separating and cleaning them. Pinks, pansies, and carnations may be transplanted, and the soil renewed with a rich compost of well-decomposed manure mixed with sand. In districts not subject to late Spring frosts roses may now be pruned, otherwise defer the work till next month ; a plentiful supply of rich rotten manure should be applied to the beds, if not already done ; a sprinkling of bone dust as well will be an improvement.

Gravel Walks.—When the gravel is soft and spongy, get two sieves—one that would not let a horse bean through, and the other somewhat larger. Gravel thus cleared of the large and small stones should be laid on, and rolled in every time the wet comes, until the surface is as solid as a rock.

SEPTEMBER.

September is the busiest month in the kitchen garden. As seed time and seed sowing are now upon us and in general operation, and believing as we do, that many of the failures attributed to indifferent seeds may be more justly attributed to some drawback as regards the preparation of the seed bed, the sowing, covering, etc., the following useful hints on the subject will be found not undeserving of perusal:—Seeds, to germinate, require light, heat, air, and moisture.

Seeds should only be sown when the ground is mellow and fine, and, if possible, before a gentle rain. The soil should be gently pressed with the back of the rake upon the seed after sowing. The best of seed often fails from improper management. If sown too early, while the ground is wet, it is apt to rot.

When sown too shallow, in a dry time, there may not be sufficient moisture to sprout it, or it may be destroyed by dry and hot weather after it has germinated, or insects may destroy the plants as soon as they appear above ground.

The first effect of air, heat, and moisture is to change the starchy matter of the seed into a sugary pulp, the proper food of the embryo. If at this time the seed be withered by exposure to heat for want of sufficient covering it will perish; or if planted in a fresh dug soil and the above change in the nature of the seed takes place, but the earth if not pressed upon it, the seed dries up and the embryo perishes. Others, again, are buried too deeply, and though the seed swells, yet sufficient warmth and air are not obtained to give it life.

The principal point to consider in sowing seeds is a suitable preparation of the soil, so that the young roots may

easily penetrate it. It must be made more or less fine for different seeds. The size of a seed is a safe guide as to the depth at which it should be sown: beans, of all kinds, require two inches of covering; peas, an inch and a half; carrots, parsnips, turnips, onions, radishes, lettuce, cabbage, and such seeds require to be sown shallow, almost close to the surface. The seed must be firmly fixed in the soil and pressed by the earth on every part, in order to retain moisture sufficient to encourage vegetation, yet not so firmly buried as to be deprived of air, or to have their ascending shoots impeded by too much soil above. The earth should be pressed firmly upon the seed with the back of the rake, or by treading with the feet in case of large seeds, or by smoothing the surface with the back of the spade. In all cases seeds should be sown in fresh-dug soil, that they might have the benefit of the moisture within; but they should never be put in when the soil is wet, as the ground will bake, and the seeds perish.

Never sow seed broadcast. When sown in drills or rows weeds can be more easily destroyed and the ground kept open and loose. Almost all kinds of vegetable seeds may be sown this month, with a prospect of success. See that the soil is thoroughly well prepared and well manured with old well-mellowed dung dug in in the early Autumn.

Peas and broad beans may now be largely sown.

Broccoli, and all varieties of the cabbage tribe, should also be sown for general crops, to be transplanted when strong enough. In sowing all kinds of the cabbage tribe, it will be found best to sow them in drills, in an open situation, and rather thinly. When sown in the ordinary Old-Country method of thickly-sown beds, they are liable to be drawn up by the heat of our climate, and seldom attain the same perfection as when grown thinly.

Potatoes.—The early varieties should be planted in the driest part of the garden. Early potatoes should always be planted whole (tubers the size of hen eggs are the best for early planting) in drills four inches deep, one foot set from set, and eighteen inches drill from drill.

Turnips may also be sown in drills, in any dry, warm situation.

Celery, for the main crop, may be sown towards the end of the month, in fine mould, in a sheltered place ; it should be kept growing freely, as a check is very injurious to it. Amateurs will find it less trouble to purchase a few plants ; 100 will suffice for a small family.

Beet may now be sown in drills eighteen inches apart, in ground manured last Autumn. Dwarf red and Dell's superb are good varieties. All kinds of salads should now be sown in small quantities, and sowings of most of them may be repeated every three weeks from now to the end of February. The main crop of onions should be got in early in September. They require a rich mellow soil on a dry subsoil. Any manure used for onions, carrots, and parsnips should be well rotted, and ought to have been dug in in the Autumn. Crops of carrots and parsnips may also be sown during this month in deep dry soils, well prepared, in drills twelve and eighteen inches apart.

Fruit Garden.—Newly-planted fruit trees should have a mulch of rotted manure over their roots. Care must be taken to see that they are not shaken by the winds. It is a good plan to firm the soil round the stem with the foot occasionally. Grafting is generally performed this month, with scions previously gathered and heeled in, in order that the stock may be somewhat in advance at the time of the scions being inserted.

Vines.—During the present month young vines may be planted, provided the new borders have sufficiently settled down and are in a suitable condition to receive them ; if not, planting may be deferred somewhat. Recently-started vines may be frequently syringed with soft, tepid water, continued till the flowers are going to expand, and then discontinued. A moist atmosphere should be maintained by sprinkling the floor, etc. Close about 4 o'clock in the afternoon, or earlier if cold winds prevail, when the house is naturally warm from sun heat. As soon as the embryo bunches show sufficiently for selection be prompt to remove those that do not promise well or that are superfluous, and stop at the

second joint above the bunch selected to remain. Thinning is a most important process in grape growing, and should be commenced as soon as the berries are the size of small peas, or rather before. Attend assiduously to stopping, thinning, and tying in the shoots. The last is an operation requiring care, as unless done gradually and cautiously the shoots are apt to snap off.

Melons.—The growing of this delicious fruit is beyond the reach of the majority of amateurs, requiring, at least in the South Island of New Zealand, to be grown under glass with bottom heat. In the warmer portions of the North Island they can be cultivated in the open. The following are the instructions for growing under glass :—Plants which have been stopped and ridged out in frames should be encouraged by a nice bottom heat of from 80 to 85, and an atmosphere of 75 or 10 degrees over, when from sun heat, closing early on fine sunny days with brisk heat and abundant moisture. Whenever the little white roots show through the sides of the ridges or hillocks, add gradually fresh soil, making it very firm ; for all through a firm bed must be afforded the melon for its growth. As soon as the laterals resulting from the first stopping have made seven or eight leaves, they too should be stopped. When further advanced, and the fruits show, and those selected to remain fixed upon, the shoots should be pinched at the joint above the fruit. The sashes should be covered carefully at night with mats, and the bottom heat be kept up with fresh linings.

Cucumbers.—Unlike the melon, cucumbers should not be exposed to strong light or sunshine ; exposure to either is calculated to make the fruit bitter ; consequently the plants should be carefully shaded during mid-day. The cucumber, too, likes a richer and more open soil, and luxuriates in warmth and moisture. Unless in the case of seed saving, impregnation is not necessary with the cucumber, though very much so in the case of the melon. Cover at night and keep up the bottom heat by linings, as directed in the case of the melon. This treatment is only necessary when it is required to have very early cuttings.

Cucumbers thrive and produce an abundance of fruit when grown in the open; they must, however, have shelter and plenty of moisture. A soaking of liquid manure once a week will produce good results. It is better to sow the seed where the plants are to stand, and thin them out if necessary, than to transplant from pots.

Flower Garden.—Bedding plants, such as geraniums, heliotropes, petunias, which have been kept in the greenhouse should now be placed in a cold frame, which can be left fully exposed to the sun and air every day and closed down at night, or the pots may stand on a verandah. Dahlias may be propagated by division of the roots at the crown, and planted out at once. They may also be propagated by cuttings. This is done by placing the roots in gentle heat; as soon as the shoots have attained a length of a couple of inches they are slipped off with a sharp knife, taking a slice of the tuber with it, placed singly in small pots, and plunged in heat; and after ten or twelve days they may be removed to a cold frame for hardening off, to be planted out as soon as all danger from frost is past. This treatment only applies to choice show varieties. For ordinary garden purposes the roots need not be lifted, but may be allowed to remain there during the winter months; a shovelful of ashes thrown on the crown will protect the root from any ordinary frost. Hardy annuals may now be sown. Finish pruning roses, and point up the surface of the beds with a broad-tined fork. Do not be tempted by the occasional warm days, which occur during this month, to commence bedding out tender plants. The middle of next month or the beginning of November will be quite time enough. This is a good time for sowing seeds of Californian and other pines.

OCTOBER.

Continue planting potatoes, and successive crops.

Onions sown in the Autumn should now be transplanted into rows about one foot apart and four inches between the plants. The work should be done with a dibble in moist

warm weather, and the soil should be prepared as for the Spring sowing of this vegetable. Leeks give excellent crops in this climate if sown in drills in October, and planted out thinly in rich soil during the Autumn. Tomatoes may be sown in October, in a hot-bed or cold frame, and planted out in November, in light rich soil, in rows, and trained to trellis work. Tomatoes are much improved by pinching the points of the young shoots as soon as the flowers are visible. The lateral, or side shoots, should be thinned also. Vegetable marrows, gourds, etc., may be sown by the end of this month in warm situations. Renew or make fresh plantations of pot-herbs, such as sage, thyme, chamomile, marjoram, parsley, etc. Plant cuttings of rosemary, lavender, thyme, etc., and make the herb garden clean and tidy. All the walks in the garden should be put in proper order. All vacant ground should be dug and cropped as soon as possible. Weeds should be destroyed as soon as they appear. This can only be done by the persistent use of the push-hoe. The constant moving of the ground between the growing crops has a beneficial effect on them.

Vinery.—Temperature, early vinery, 75° to 80° by day; night, 65° to 70° . Thin the berries as directed last month, before they are the size of small peas. In thinning, do not cut the shank, but point the scissors just between the berry and the petiole, leaving the broad end, or seal, attached to the latter. The operator should be very careful not to touch the berries with his fingers or his hair, as this removes the fine, powdery flue or bloom, so beautiful in well-grown grapes, which is never after restored, and which is calculated to preserve the berries from many injuries, particularly water, which cannot remain on them as long as this fine, powdery substance is preserved. Late vines will now be pushing. Temperature in the late vinery, day, 70° ; night, 60° . Attend to former directions in stopping the laterals, removing secondary shoots, and tying-in. Do not syringe the vines when in flower; but shake the trellis daily to disperse the pollen. Maintain a moist, warm atmosphere. Pot vines should be kept near the glass, and be liberally supplied with liquid manure.

Fruit Garden.—Finish grafting this month. Mulch newly-planted trees with well-decomposed manure, both to nourish them and to prevent the ground from drying and cracking, treading the soil firmly at the same time about the stems. Keep the runners of strawberries from rooting by passing the hoe under them and shifting them frequently till they have finished their growth; dress with soot in showery weather. Look closely after slugs, which will now be numerous and destructive. A light dusting of fresh-slacked lime once a week will destroy all slugs.

Flower Garden.—Prepare for summer bedding by forking and intimately incorporating compost or other dressing which may have been applied to the beds in the Autumn; do not make the beds too rich, especially for scarlet geraniums, otherwise they will produce more leaves than flowers. Mow, sweep, and roll lawns and walks as required. Plant hardy annuals, biennials, and perennials; protect such as have been wintered in frames till they are properly established. Sow another crop of annuals—hardy kinds in the open ground where there is room. This is also a good time to put in a small sowing in a frame of primula, cineraria, calceolaria, and cyclamen. Divide and propagate all perennials. Prune roses intended for late flowering. Auriculas, in order to bloom them to perfection, for show purposes, should be protected from the noon-day sun by a semi-transparent covering; allow them the full benefit of the morning and evening sun. Early-struck, show dahlias may be removed to a cold frame to harden them off.

NOVEMBER.

Kitchen Garden.—The principal work of the month will be the thinning, cleaning, and planting out of the crops already sown. Stir the soil frequently with the push hoe, and destroy all weeds as soon as they appear. Cress, lettuce, and all other saladings, should be sown in small quantities at intervals of a fortnight or three weeks. Beans should be sown now, both the French and common kinds.

Peas should be sown in considerable quantities, say twice during the month, according to requirements. Cauliflowers and broccoli may be sown for the later crops, and the earlier sown crops of these vegetables should be planted out on well-manured ground. Spring-sown cabbage should be transplanted for Autumn supply. Sow early sorts of cabbages for Winter use, also curled kale, savoys, and brussels sprouts, any of which may be planted now. An occasional dusting with fresh-slacked lime will destroy slugs and help to keep off small birds. Ridge cucumbers, vegetable marrows, pie melons and pumpkins may now be sown out of doors. Cutting asparagus should not be continued longer than is absolutely necessary, as it is very important that the plants should have sufficient time to make good growth and allow the buds for the ensuing season's supply to become matured. Abundant supplies of liquid manure may be given, and in exposed situations it is advisable to secure the stems to stakes a few feet distance apart, and connected by tarred string passed from stake to stake. Seakale must be kept from seeding by breaking off the flower stems; and if the crowns are very much crowded, thin them so as to leave two or three to each strong root. Liquid manure will assist the growth; similar remarks apply to rhubarb. Celery may still be sown, and the plants raised in September should be planted out about the end of the month in trenches of richly-manured soil, and watered copiously during dry weather. Potatoes may still be planted, and those previously put in should be well stirred between the rows with the push-hoe. Tomatoes may now be planted out in rows, and trained to a trellis in a sunny situation, or to upright stakes. Turnips and radishes should be sown at short intervals throughout this and the next month. Birds are very troublesome during this month, and should be kept off the seed beds by wire netting or otherwise. The chaffinches, green linnets and blackbirds are usually the most troublesome in seed time, and in the fruit garden.

Flower Garden.—This department should now be putting on its Summer appearance. The later kinds of Spring flowers, and those of early Summer, should now be in full bloom. Hardy annuals may still be sown for Autumn

flowering. Annuals sown in September should now be thinned, and the thinnings transplanted during showery weather. Herbaceous perennials may now be propagated by cuttings of the young shoots, and those kinds which root naturally may be divided and removed to any part of the garden requiring furnishing. Dahlias should be planted out without delay; a rich deep soil and open situation, but sheltered, should be chosen for them. Plant out pelargoniums, verbenas, petunias, heliotropes, and other half-hardy and tender bedding plants in beds on the lawn, or in groups in the borders. All lawns and grass verges should be closely mown and rolled once a week, and all the walks and borders in the garden should be kept in the highest state of neatness.

DECEMBER.

Kitchen Garden.—Another sowing of broad beans may be made this month for a last crop. Peas, for Autumn crops, may also be sown any time up to the end of the month. Should the season be dry and hot, the only chance of a crop will be by copious watering, at least once a week after sunset. Cauliflowers, cabbages, brussels sprouts, broccoli, etc., should be planted out as soon as they are strong enough, in rows two feet apart, and two feet from plant to plant. It is a good plan to dip the roots in a mixture made of cow or horse manure mixed with earth and a dust of superphosphates made into a thin paste. Seeds of these may also be sown for successional crops. All sorts of salads should be sown frequently in small quantities. Potatoes may still be planted, but the crop is not to be relied on. Those previously planted should be kept clear of weeds, and earthed up as required. Turnips may be sown now, selecting showery weather if possible. A successional crop of kidney beans or scarlet runners should be sown about the middle of the month. The moment a plot of ground becomes vacant, dig it forthwith for a successional crop. Keep the push-hoe constantly going amongst growing crops. Sow French beans, peas, cabbages, lettuces, radishes, spinach, etc., in succession; and radishes, mustard and

cross every three weeks ; sow turnips and beet for late crops. Plant out cabbages for succession, cauliflowers for a full crop, early celery in trenches, onions on rich prepared ground, early varieties of potatoes for late crops. Of recent years the diamond back moth (*Plutella Cruciferarum*) has been a plague destroying everything of the cabbage tribe. *It commences its ravages in December.* So destructive has it proved that the growing of anything of the cabbage tribe has become most precarious. There appears to be no remedy for this pest. Protect and shade tomatoes or other plants turned out from pits and frames, until they are well established, and rooting freely. Water seed beds in dry weather always at night ; dust with soot or lime, to destroy insects. Cucumbers for pickling may still be sown ; they thrive best in rich, deep, moist soil. Plant out capsicum with rich compost. Keep the shoots of tomatoes well tied, if grown against a trellis ; remove useless laterals, thin out the clusters, selecting for removal such fruits as are small and unpromising. These may be pickled in jars. Liberal doses of liquid manure will greatly help the production of fine large fruit. Now is the best time to put layer strawberry runners into pots for early forcing.

Vines.—When the crop is approaching maturity keep the atmosphere rather dry than otherwise, give air freely, and leave on a little at night. In the case of later houses, the atmosphere should be kept moist, by frequently damping the floor and other exposed surfaces. Remove secondary shoots, sling and tie out the shoulders of large bunches, and if necessary thin the berries further. The size of the berries and symmetry of the bunches depend largely on proper and timely thinning. In the case of grapes intended to hang late, thinning should be all the more pronounced. The strength of the vine should be the standard by which to judge the weight of crop it will be able to mature, without deterioration of the quality of the fruit or injury to the future bearing of the vine. It is, therefore, safer to allow one bunch only to remain on a shoot than two or three, even though the vine be strong and vigorous. The borders, both inside and outside the house, should have a good soaking of liquid manure while the berries are swelling, and just as

they commence to colour. Before soaking the border, point the surface over very lightly and somewhat roughly. It will then drink in the moisture regularly and deeply, instead of, as is too often the case, allowing it to pass over the surface with scarcely a drop finding its way to the roots. After soaking the border, a light mulching over to prevent evaporation will be of great advantage. Should the slightest trace of mildew appear, dust the affected parts immediately with flour of sulphur, and for a few days keep the atmosphere rather dry and the temperature somewhat higher.

Where due preparation has been made for planting, the present is about the best time for planting out young vines struck from eyes early in the year. With plenty of heat, moisture, and a genial atmosphere they will develop into fine canes, reaching the ridge of the house before the end of the season. The growth of newly-planted vines should be stimulated by affording them plenty of heat and moisture and closing early in the afternoon, with abundance of sun heat. In the case of early forced vineries, as soon as the crop is cut it is important that they should have abundance of air, and a free circulation of it. Care, too, should be taken to syringe the foliage frequently, both to keep red spider in check and the former clean and vigorous until they have fulfilled their functions.

Cucumbers in Frames.—Cucumbers require much more shade and moisture than melons; the heat, too, should be well kept up, as they are sure to resent any check resulting from any deficiency of it. Plants which are in full bearing will be greatly invigorated by having a soaking of liquid manure and a rich top-dressing afterwards. Syringe or water overhead from a rose every fine afternoon, and close with plenty of sun heat; the growths, in whatever stage, should be kept regularly disposed, and never allowed to get crowded or confused.

Flower Garden.—Fill vacancies as they occur with annuals or bedding plants reserved for the purpose. All newly-planted trees and shrubs should be freely watered in dry weather. One good soaking once a week is more beneficial than a lighter application applied much oftener.

Dahlias, and similar tall growers, should be supported with strong stakes, and their superfluous branches removed. The flower borders must be carefully attended to, and all weeds destroyed as soon as they appear. The oftener these borders are hoed, the better they will look, and the plants will thrive better. All decaying branches should be at once removed. Border auriculas, primulas, and polyanthus may be divided and replanted in well-prepared, deep, rich soil. Increase carnations, picotees, and pinks by cuttings, pipings, and layers, and choice double wallflowers by slips, or cuttings. Roses will now require a good deal of attention. Wash the bushes well with a vigorous syringing of soft water, and occasionally, if fly appear, with quassia water (about a lb. of chips to four gallons of water), or with Gishurst's compound, two ounces to the gallon of water. A good soaking of liquid manure at the roots, and a mulch over after, if not objected to on the score of appearance, will be of much service in helping the swelling blooms and invigorating the plants. Suckers should not be tolerated; trace them to their origin and cut clean away with a sharp knife. Buds may now be put in if the bark rises freely. Look over and ease after a week or ten days the bandages of any which have taken. Continue to plant out stocks and asters (the latter particularly require a deep, rich soil, if fine blooms are desired). Thin out all superfluous shoots of dahlias, when sufficiently advanced. Stake all tall growing plants as well. Ordinary bedding plants will now be making strong growth. Clip box edgings, weed and roll walks, mow lawns and grass plots, and save seeds of choice annual and other plants as they ripen.

JANUARY.

Kitchen Garden.—Clear off all crops as they become matured, and prepare the ground for others; hoe between growing crops; and gather seeds and herbs as they arrive at maturity. Make a sowing of early cabbages towards the end of the month for planting out in Autumn and Spring; sow kidney beans for late use; sow lettuces thinly, to stand without transplanting, and onions to draw young; also early

sorts of peas to come in late; spinach and turnips for a full crop. Sow radishes and small saladings once in ten days; plant out celery, broccoli, cauliflowers, lettuces, and early and late cabbages for full crops. Choose showery weather for planting. Earth up celery—encasing the plants in three-inch tile pipes is said to be a clean method of blanching; raise and dry onions, shallots, and garlic, and store; cut herbs when in flower, and dry in the shade: stop tomatoes, and do not allow the leaves to shade the fruit; take up early potatoes and dry and green them in the sun for future planting; top beans; keep scarlet runners staked; and thin late-sown onions, carrots, turnips, and beet. Some of the most vigorous shoots of the cucumbers and vegetable marrows will require pegging down, or bits of brick or stone put on them to keep them down and cause them to root. In dry weather water abundantly, so as to keep them in vigorous health, and prevent mildew; watering should always be done after sunset in warm weather and copiously.

Vinery.—Day temperature, 80° to 85° ; night, 70° . Remove secondary shoots; stop laterals on late vines; tie out and thin the berries, as directed last month; keep up a steady moist heat, with free air, but do not syringe. Towards the end of the month or sooner, if the crop be removed from the early vines, admit abundance of air day and night to harden the wood.

Hardy Fruit Garden.—Tie and secure the shoots of grafts; cut down the strongest to three or four eyes: they will throw out laterals that will ripen in the Autumn. Continue watering newly-planted trees if the weather be dry—a thorough good soaking once a week will suffice; attend to trees against walls or fences, remove superfluous wood, and nail or tie in that which is to remain; protect ripening fruit from birds by netting; thin peaches, nectarines, and apricots; bud fruit trees, and water them freely in dry weather; remove suckers and weak wood from gooseberries and currants; thin out weak shoots from raspberries, leaving only those wanted for next year's crop; attend to the straw-

berry beds, by preventing the too rapid growth of runners by moving them about with the hoe to prevent them rooting.

Flower Garden.—The flower garden, if well managed, should now be a blaze of colour ; constant attention must, however, be paid to rolling, mowing, and staking. Care is now necessary in tying up carnations and picotees, thinning the flower buds, and layering (See article on layering). An excellent plan for keeping carnations, pinks, picotees, and fuchsias off the ground without staking is to take a piece of wire netting, 12 to 15 inches wide ; cut off a length of, say, 27 or 30 inches. Make a circle of it, binding it together by the ends of the wire where they meet. Place this hoop over the plant, and peg it down with a couple of laths passed through the meshes and driven into the ground. By adopting this simple plan much trouble and time will be saved. The leaves of the plants cover the wire, giving them a tidy and elegant appearance. These wire hoops will last for years if taken care of after each season is over. Remove decayed blooms of roses, or those that are spoiled by continued wet. Give every attention to staking plants with single stems, such as hollyhocks, dahlias, etc., lest high winds and heavy rains injure them ; do not trust to one tie, but make as many as will secure the plant from being injured, always observing not to bind too tight ; this is particularly to be attended to in tying dahlias ; for if sufficient room be not left for the swelling of the stem, the ligature will cut it ; and if, by any chance, the upper ties give way, the head will snap off. Most of the hybrid China roses will now be fit to take buds from. Select shoots on which the buds are most plump. Other kinds of roses may now also be budded. The plumpness of the eye is the only criterion by which to judge whether the bud is fit to be put in. Examine those previously budded, and slacken the ties. (See instructions for budding). Lift tulips, hyacinths, ranunculuses, and anemones as soon as their foliage has decayed, and store them in a dry, airy place. It is not absolutely necessary that these bulbs should be raised annually, on the contrary, they are sometimes greatly benefitted by being left undisturbed for a couple of years.

Stake and tie up chrysanthemums, watering freely when necessary, giving liquid manure once a week (See instructions for making liquid manure).

FEBRUARY.

A final sowing of peas should be made in the first week, and may possibly yield a few dishes during the beginning of Winter. Cauliflowers and broccoli should be sown about the end of the month for planting out in early Spring, choosing a sheltered situation; sow thinly. Onions intended to stand over winter should be sown during this month; if left until next month they are very liable to be thrown out of the ground by the frequent thaws of our variable Winter. A sharp look-out should be kept for slugs and wood-lice, which are becoming a terrible nuisance in some parts of the colony. An occasional dusting of fresh slacked lime is destruction to slugs. Trench or dig as either seems expedient as soon as a crop is removed, and let another adapted for Winter and Spring use take its place. Sow as early in the month as possible cabbage seed, to produce plants for putting out in March, August, and September. Sow endive and lettuce thinly where the plants are to stand, and thickly when they are to be transplanted for Winter and Spring use; also radishes and small salading in succession. Plant out cauliflowers and broccoli for Spring use, celery for a full and late crop. The diamond back or turnip moth will probably be troublesome this month, frequently destroying the young plants of the cabbage tribe. Once they make their appearance the crop is generally doomed. The best preventative is to keep the plants growing vigorously, and an occasional syringing with tar water. Earth up celery, but only when the soil is quite dry; hoe and fork lightly between the lines of all growing crops. Raise and dry early-sown onions as they ripen, also shalots and garlic. Never allow a weed to live, much less to seed in the kitchen garden. Remember the proverb, "One year's seeding makes seven years' weeding."

Vines.—Where the crop has been an early one and the fruit off, all dead leaves should be removed, and the remaining foliage thoroughly syringed. Plenty of air day and night should be the rule, doors and ventilators left open, and occasionally a brisk dash of the syringe given to keep the leaves clean and healthy to the end. If considered desirable, this would be the right time to remove a portion of the surface soil of the border, and replace it with a fresh compost formed of nice fibry loam, with a little bone meal added. In late houses, where the fruit is only showing colour, a good soaking of manure water and a light mulch over the surface will tell advantageously. When fully ripe, stop and thin the shoots, and keep the atmosphere rather dry. Remove all young and superfluous growths. Ventilate early in the mornings, and be sure to leave a little air on at night; and in all cases a watch should be kept on the foliage for one of its worst enemies—red spider. Young vines planted this season should be carefully attended to as regards syringing and watering, in order to push on growth and secure an early and thoroughly ripened rod.

Melons.—Stop and arrange the shoots of plants intended for a late crop. Keep the shoots rather thin and clear of secondary growths and tendrils. In the cases of ripening fruit be chary of water, but give air freely, and in order that the fruit may have the full benefit of light and sunshine, elevate it somewhat above the foliage. It is a great mistake to allow melons to get dead ripe before cutting; they will be far better both as regards flavour and keeping if cut the moment the fruit swells and cracks round the connection of fruit and stalk. On the other hand, plants swelling a crop should be liberally watered with manure water.

Flower Garden.—Towards the end of the month numerous kinds of herbaceous plants may be propagated by cuttings. It is much better to do this now than later on, as the cuttings will have a better chance of making the roots which are so necessary to enable them to stand the Winter. The last week of this month—unless the weather be very dry—is the best time for putting in cuttings of evergreen

shrubs, such as laurels, sweet bay, escallonias, pittosporum, etc. Cuttings of roses put in towards the end of this month will probably succeed better than at any other time. Seeds of favourite flowers should be carefully gathered as they ripen, and be correctly labelled before putting away. A few small patches of the very hardiest annuals may be sown in the borders; and the utmost attention should be given to keeping down all weeds, so that they may not shed their seeds. Remove suckers from recently-budded and other roses, stake and tie up carefully those whose buds are pushing, lest the latter be destroyed by high winds. Proceed with budding. This is an excellent time to put in cuttings of roses from the wood of the current year, when ripe, with a heel of last year's wood attached. Propagate without delay all sorts of bedding plants, pansies, &c., if not already done. The seed vessels or capsules should be at once picked from rhododendrons; and, indeed, from all other flowering shrubs. It should be remembered that it is a great waste of power and injury to plants to allow them to ripen seed that is not specially required to save. Pipings of pinks or carnations, and also cuttings and layers now rooted, may be planted out in well-prepared beds, and will require attention as to watering. Finish layering carnations and picotees without delay. Dahlias and other tall-growing plants should be carefully staked. Pot auriculas in compost formed of sandy turf loam and thoroughly decomposed cow-manure, shake out the roots before repotting, place in a close frame, and shade for a few days. This treatment, however, is only necessary when the plants are required for show purposes.

MARCH.

Kitchen Garden.—Sow small quantities of endive and lettuce, and also a little onion seed. The latest crop of celery should now be put in, and those previously planted should be earthed up as soon as they attain a sufficient size. The earthing-up must be carefully performed when the soil is moderately dry, and may be done two or three times.

Cauliflowers and cabbage plants may still be set out for Spring use, and liberally supplied with liquid manure.

Prickly spinach for Winter and Spring use should be sown now. It is an excellent vegetable much neglected in this Colony. It should be sown in drills in deeply-worked ground, with an abundance of manure, and carefully thinned and kept clear of weeds as it advances in growth. The main crop of onions should now be lifted and spread out thinly on the ground to dry; if the weather should be damp, it will be advisable to remove them to a gravel path or to some dry place exposed to the sun; they should be turned over once a-day till they are thoroughly dried, and then stored away in a well-aired loft or storeroom or strung in hanks. Various kinds of biennial herbs should now be sown. A final crop of turnips may be tried, the best kind for late work being the Old Snowball. Remove all decayed leaves, haulms, and the remains of all crops which have been taken up, in order to preserve that neatness which is so desirable in the kitchen garden.

Towards the end of the month prepare the ground where it is intended to plant new fruit trees. Our reason for recommending the preparation of the ground now is that we are convinced that early planting is very desirable in most of the districts of New Zealand, on account of the extremely changeable nature of the Winter. Indeed, we are convinced that trees planted in the latter end of April will do better than at any other season.

Raspberries should be pruned as soon as the wood has thoroughly ripened; that is, the dead canes should be cut out, leaving the present year's growth to bear fruit next season. It is advisable to cut away all except the six strongest canes, and these should be shortened to different lengths according to their strength, and tied loosely together with flax or cord.

Young plantations of strawberries may now be made with every prospect of success. The ground should have been trenched two feet deep and well manured, and should not be dug again, being merely forked over, while the crop remains in the ground say three years.

Flower Garden.—This is not a busy time in the flower garden, the principal work being the frequent hoeing of borders, and the gathering of such seeds as are now ripe. A few cuttings of the finer herbaceous plants may be put in now, and most of the deciduous shrubs will be found to strike best if put in at the end of this month. A few plants of auriculas, primroses, polyanthuses, violets and lily of the valley may now be potted in four-inch pots, using the compost recommended for bulbs; these may stand in a cool place where they will not get much sun, keeping them well watered. On the first appearance of frost remove the pots into the greenhouse. They will make a splendid show in August and September, together with the bulbs. As soon as they have finished blooming the plants may be turned out of the pots and planted in a cool border; fresh plants should be used for each year. These plants require an abundance of water while growing, and should be watered overhead daily with a fine-rose watering pot, otherwise the green fly may destroy the foliage. Place a saucer under each pot.

Cuttings of various kinds of pelargoniums, verbenas, and all other half hardy plants may be struck now in pots or boxes.

Potting bulbs for winter blooming in windows and cool houses (by which is meant glass houses which are not artificially heated). The end of March or beginning of April is the proper time to plant hyacinths, tulips, freezias, and lachinalias. Prepare a heap of soil made up as follows: two parts good strong loam, one part peat mould, and one part of thoroughly decomposed manure from an old hot-bed or manure heap, break it up fine and mix well, adding a little sharp sand and a little bone meal, one lb. to a barrow-load of the composition. Any good soil will, however, answer.

For hyacinths, take six inch pots (if new they should be soaked in water for a few minutes the day previous to using), cover the hole in the bottom with a few broken crocks, spread a handful of the roughest of the compost over them, then fill to within one inch of the top, place

three bulbs at right angles in each pot, pressing the soil gently but firmly round each bulb, leaving the crown barely exposed. The pots should then be plunged in sand or coal ashes (if at hand) in some convenient place, covering the pots completely over to the depth of two or three inches : a few days after planting a copious supply of water may be applied. In about six weeks time the bulbs will have made some growth, when the pots may be taken up, cleaned, and removed to the window or cool house where they are to bloom, placing saucers under the pots. Hyacinths require an ample supply of water while growing, but it must not be allowed to stagnate in the saucers.

Tulips.—A few of the dwarf single and double varieties may also be potted for early blooming. Three or four bulbs may be planted in a six inch pot, covering them with two inches of soil.

Freezias, lachinalias, and crocuses may be treated in the same manner, but from 8 to 12 bulbs may be put in a six inch pot. Four inch pots may be used, when six bulbs will suffice, plunging the pots as directed for hyacinths.

APRIL.

Kitchen Garden.—Lettuces may be transplanted into rows in a dry warm situation, where they are to remain during winter. It is advisable to plant rather thickly, especially in damp rich soils. The remainder of the potato crop should be carefully lifted and stored in a pit or outhouse ; care should be taken not to place them in very large heaps, as they are liable to ferment, and are often very seriously injured thereby.

Carrots, beet, and artichokes should be lifted and pitted in dry sand under cover, after removing the tops, but they may be left in the ground for a couple of months longer. In digging up the roots of beet, care must be taken not to bruise them, for if this be done they bleed and deteriorate in quality. Parsnips will be better left in the ground and taken up as required. They will, however, commence to

grow in August, when they are no longer fit for the table. They should, therefore, be raised not later than the middle of July and pitted. Broad beans intended for Spring use may be sown now in the sunniest part of the garden. The old stalks of asparagus, etc., must now be removed, and the beds forked and raked, and dressed with a coat of well rotted manure with a good sprinkling of salt. The last crop of cabbages may now be put out in rows in the usual manner. Celery should be carefully earthed up on fine dry days, so that the soil placed against the stems may be moderately dry.

A small quantity of French breakfast or long red radish may be sown in the warmest part of the garden. The first sowing of peas should be got in towards the end of the month. The best kinds for sowing now are First Crop and First Crop Blue, from both of which we have had excellent dishes gathered in October; we must, however, add that we do not advocate sowing out of season, except under exceptional circumstances, as to situation and aspect, we have rarely seen much gained by Autumn sowing. All vacant pieces of ground should be either trenched or deeply dug; and all decayed leaves, etc., should be buried in digging, or they may be gathered and put in a heap in some out of sight corner to decay and form leaf mould, a valuable adjunct to the potting shed.

The ground for young fruit trees having been prepared last month, the planting may now be proceeded with, unless the soil be very dry, in which case it will be better to defer it for a week or two; but if the season is at all favourable, it is decidedly advantageous to plant at once, as the trees will be able to make embryo or young root fibres before the Winter weather comes on, giving them the start of Spring-planted trees. Plantations of small fruits may also be got in now; and cuttings of gooseberries, currants, etc., should be inserted in a sheltered border. (See how to make gooseberry and currant cuttings).

Flower Garden.—In the flower garden department there is much to be done this month. The final clearing and weeding should be given to all the beds and borders;

and any dead leaves, rubbish, etc., may be buried. Bulbs at present in the borders, if too thick, may be lifted and divided, or removed to better situations. In transplanting lilies care must be taken not to allow the bulbs to remain long out of the soil—they should be planted at once. Fine dry weather should be selected for this work, indeed, the soil in flower gardens should never be touched while wet, as it runs together, and the fine fibres of the growing plants cannot have full scope—the plants will not thrive as they otherwise would. Herbaceous plants may also be divided and transplanted. All kinds of shrubs and trees may be planted with success after the middle of the month, though in very dry seasons or dry situations it may be better to defer it for a short time. The putting in of cuttings of shrubs, such as laurels, laurestinus, privet and other shrubs which strike freely should be continued during the month, but no more flower seeds should be sown before Spring.

MAY AND JUNE.

The month of May may be said to close the season in the orchard, the kitchen, and the flower garden; and all future operations will have in view the necessities for the coming year. The successes and failures of the growing months just past will have suggested many alterations which the careful gardener, be he amateur or professional, will not be slow to note and act upon. The usual routine work of pruning, transplanting, manuring, and trenching requisite (described elsewhere) at this season will claim attention. Continue to clear away the decaying leaves and haulms of rhubarb, seakale, and asparagus, and to treat with a liberal dressing of strong loose manure. Make new plantations of raspberries.

Planting Orchard Trees.—At this season, when planting is being largely carried on, it may be well to warn the inexperienced against the too common practice of planting trees too closely. Too frequently two trees are planted where there is only room for one. Plantations continually come under notice in which the trees are planted

much too thickly. Large, strong-growing kinds of apples and pears should stand at least from twenty-five to thirty feet apart if the soil is strong; for although many planters say they will cut out the supernumerary trees as soon as they encroach on each other, it is very doubtful whether, if they are producing anything like good crops, they are not left long enough to spoil all before any are removed. A good plan in cultivating orchards is to plant the tall standards at the fullest range they are ever likely to occupy, and to fill the intermediate spaces with dwarf spreading trees, as orchards thus treated are sooner remunerative than when they are planted with tall growing trees only.—(*See notes on tree-planting.*)

Transplanting and Pruning.—Fruit trees should be attended to as soon as the leaves begin to fall. However carefully young trees may be lifted, some of the roots will be broken, these should be pared clean with a knife. Trees afflicted with the American blight should be carefully dressed with a mixture of soft soap, kerosene, and hot water, applied with a hard brush. Blighted trees should, however, be discarded, and those grafted on blight-proof stocks substituted.

Finish pruning gooseberries, currants, and raspberries. In pruning raspberries, cut away the wood which bore this year's fruit, thin out the suckers, leaving five or six of the strongest for fruiting next season, which should be tied together. Black currants will not bear cutting back, they should, however, be freely thinned out when necessary.

Clean strawberry beds by cutting away all runners and some of the outside leaves; fork slightly between the rows, removing all weeds; finish off with a dressing of well-rotted manure or short stable litter three to four inches thick—failing a supply of this kind of manure, a dressing of fine bones may be used, 3 lbs. to the square perch equal 4 cwt. per acre.

Tomatoes.—When danger from frost is apprehended, the season may be prolonged by protecting the plants, or some of them, by thin canvas or papers. Some growers pull them up and hang them up in sheds, etc., for the same

purpose. Secure the green tomatoes in sufficient quantities for spiced and other pickles, before the frost injures them.

Vines.—In the case of late grapes still hanging, care should be taken to avoid wetting the floor or other exposed surfaces. Keep such houses closed during foggy, muggy weather; but air freely on brisk, dry, bright days, when a little fire heat may, at the same time, be used advantageously. Keep a sharp look-out for the appearance of mouldy or decayed berries, and promptly remove any showing the slightest taint. Vines from which the crop has been removed should be pruned, cleaned, and dressed with some approved mixture as soon as the whole of the leaves have fallen off. In the case of vines intended to start only when nature moves them and ripen a crop in ordinary course of the season, the borders may be lightly pointed over with the fork, and then have a good coating of well-rotted farm-yard manure.

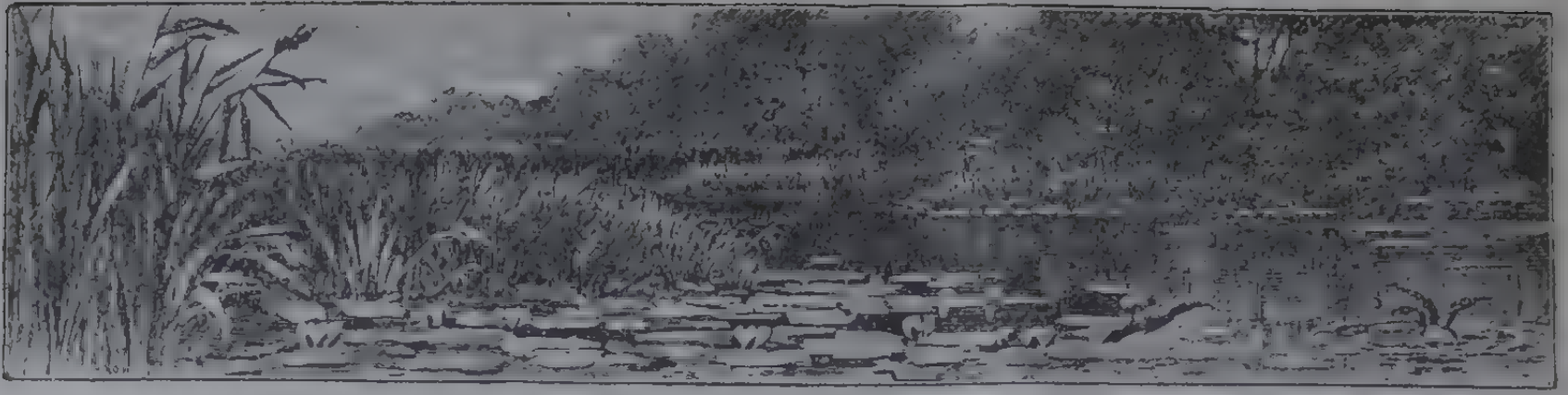
Flower Garden.—When the weather is dry and the ground in favourable working condition, proceed vigorously with alterations, but avoid as much as possible any such work in wet, sloppy weather; and if there be any unevenness or inequalities in grass plots, the sod should be lightly skinned, the bare portion made perfectly solid and firm, and the sod relaid and well rolled. Dig and trench all vacant flower beds, leaving them roughly turned up during the winter months. Plant ornamental trees, shrubs, roses, etc., but only in mild open weather—never during frost or wet. Collect fresh composts, and turn and mix old. Take care to have a good supply of compost under cover, so that it may be ready for use at all times. Cut out the dead and superfluous wood of rose bushes. Remove all suckers cutting them close to the parent stem. Give a good dressing of well-rotted manure and a little bonedust. If not already done, lose no time in planting hyacinths, bedding tulips, and Spring flowering bulbs of all kinds. The first planting of anemones may now be proceeded with; also the early flowering varieties of gladioli. In the mixed herbaceous border all old flower stems, withered leaves, in a word—everything unsightly and objectionable should be removed; the surface between the plants lightly dug or forked over, and

then, provided the appearance is not an objection, give a dressing two or three inches thick of well-decomposed manure.

Dahlias will be destroyed by the first frost. Cut the stalks near the ground and lift the roots, selecting a warm day, doing the work in the morning that the roots may dry all day in the sun. Be sure to securely label the different varieties before putting them away ; any place suitable for keeping potatoes will answer. The roots may, however, be left in the ground, and when they come up in the Spring thin out all the weakly shoots and leave two of the strongest, but one will suffice.

Geraniums, if not already attended to, should be lifted after the first sharp frost, trimmed, and heeled in in boxes or large pots, where they may receive the little attention and protection from frost which they will require during the next four months—they must, however, be kept free of withered or mouldy leaves. Rose stocks should now be planted ready for budding or grafting ; plant eighteen inches apart, in rows two feet apart. Rose beds should now be dressed with rotten manure, to be forked in in the Spring. Never use a spade, the use of which destroys the surface roots. Fuchsias should be cut down close to the surface of the ground after the first severe frost ; they may remain in the ground ; a shovelful of ashes or sand thrown over them is all that they will require, even this precaution is not necessary in ordinary seasons. Plants treated in this manner flower better in the following season than those turned out of pots in October or November.





VEGETABLE GARDEN.

(Arranged Alphabetically for convenience of Reference.)



ARTICHOKE (GLOBE). — The best variety for cultivation is the Globe. Soil—a deep rich loam. Propagation by seed.—A sixpenny packet sown in a drill two inches deep, thinned out to six inches, and transplanted when strong enough into their permanent position, two feet apart each way ; sow in September. By plants, which is the easiest and the best method.—

Procure suckers from old roots in the Spring, in August or September, select such as are crisp and tender, if tough and stringy they are worthless. Plant in rows four feet apart and three feet in the rows. Plant two or three suckers in each clump, mulch round the roots during Summer, remove all weak suckers about November.

The plants will produce a succession of heads from January to the end of March. Winter dressing.—Clear away the old leaves and dress with manure, being careful not to cover the crown. This delicate vegetable which was once highly esteemed for some reason has fallen into disuse.

Artichoke (Jerusalem).—Plant in August or September, in rows three feet apart, and six inches deep, and two feet in the rows. They thrive best in a moderately rich friable loam. If the soil is poor abundance of manure should be dug in in May, in order that it may be well incorporated with the soil at the time of planting. The after culture will consist of keeping the weeds down, thinning out the stems should they exceed two or three. The plants grow up four to six feet high, and consequently suffer greatly from high winds. A good plan is to drive in a few stout stakes round and through the rows, then to weave ropes made of flax or any other material to hand, such as binding twine or old ropes, from stake to stake, these will support the plants. In May the tubers will be ripe, and may be dug and pitted as potatoes, or they may be left in the ground and used as required, this is the better plan. They must not, however, remain longer in the soil than the middle of August or the beginning of September, as they will then commence to grow and become worthless for culinary purposes. This vegetable is not grown as much as it deserves to be. Some of the English seedsmen are now advertising a round smooth-surfaced artichoke. A variety of this kind would be an acquisition, the older variety being objected to by cooks on account of its uneven surface and the difficulty of peeling them on that account.

Asparagus.—Plant in August or the beginning of September. The conditions of the successful culture of asparagus are :—First, deep dry soil, trenched at least two feet deep incorporating an abundance of manure ; second, leave off cutting by the middle or end of November ; third, not cutting down the stems till they are quite ripe. This should be done in the morning while the stems are moist, in order that the haulm may be removed without shedding any of the seed capsules. This point should be attended to ; if neglected, the bed gets choked with young seedlings, to the great detriment of the standard plants. Care must be taken to destroy the seedlings as they appear each Spring.

Planting in rows on the flat is now generally adopted instead of in beds. Plant in rows at least two feet apart (we would prefer three feet) and two feet plant from plant,

with three-year-old plants, one or two-year-old plants will answer equally well, but they will not come into bearing so soon, and the difference in price is very little. The following is recommended as being the best method of planting:—After the bed has been finally prepared by being forked over and raked, mark out the rows two feet apart, a deep trench may be opened and the plants inserted, taking care to spread out the roots like a fan against the cut, the crown of the plant being kept two or three inches below the surface. If the plants have been raised in a seed bed they must be lifted with care, injuring the fibrous roots as little as possible. Beds formed of three-year-old plants will afford a slight cutting, the second year after planting; from the fourth year out they will be in full bearing, and will last for many years if the above instructions are properly attended to. Winter dressing.—In May, or as soon as the stalks are yellow, they may be cut close to the ground and removed, carefully avoiding the scattering of the seed berries for reasons already stated. Then top dress with a coat of rotten manure, at least three inches thick, and a dressing of common salt at the rate of a quarter of a pound to every square yard. In August the bed should be forked over carefully, removing all the rough manure. Cutting should not be commenced till the shoots are six inches above ground, and cut them only half-an-inch below the surface. Nearly the whole shoot is then eatable, and the flavour beyond all comparison superior to that which has scarcely seen daylight. A shilling packet of seed will produce plants sufficient for a good bed. Sow in September, in drills one and a half inches deep and one foot apart.

Beans (Broad) thrive best in strong loamy soil, which should be well manured. A small sowing may be made in May in a warm sheltered situation but exposed to the sun. The main sowing should, however, be deferred till August, making sowings every three weeks where a large supply is required till the end of September. Green and White Windsor, Beck's dwarf Green Gem, and the Mammoth Long Pod are well known, and certain croppers, sown in rows two feet six inches apart, in drill four inches deep, and dropped four inches apart in zigzag fashion—°.°.°. One

pint at each sowing will suffice for a small family. This quantity will sow a row seventy feet long. As soon as the plants have attained to, say, three feet high, each plant should be topped, taking off about two inches. This treatment tends to make the pods come to maturity sooner than they otherwise would.

Beans (French).—There are many varieties, but for general purposes the Caseknife and Canadian Wonder are good croppers. Sow in drills two feet apart, three inches seed from seed, and two inches deep. Drills may be opened by drawing the rake, end on, along a garden line stretched from end to end of the plot. A little fine bone-dust scattered along the drills will help the crop. Cover the seeds with the back of the rake, firming it at the same time with the back of the rake or with the feet. If the weather be very dry a light roller may be used. Stakes will have to be provided for these. Height, from four to six feet. One pint will sow seventy-five feet. For Dwarfs.—Canadian Wonder and Ne Plus Ultra can be recommended as good croppers. Same treatment as given for the runners, except that no stakes will be required, and they may be sown thicker. Commence to sow from the middle of October till the end of December. One pint will sow one hundred feet.

Beans (Haricot).—We would recommend this desirable bean to the notice of every one possessed of a garden. They are dwarf growers. Sow in November, same as French beans, and let the crop ripen. They are a delicious and most nutritious vegetable; the beans are pure white. The simplest mode of cooking is to steep them over night, boil till soft, serve them up with a little butter, salt, and pepper. Half-a-pint will fill a large vegetable dish.

Beet.—Of the varieties cultivated for their roots, the Dwarf Red and Dell's Superb are the best. Beet will thrive in any good garden soil. Manure should never be applied with the crop, indeed this remark applies to all garden vegetables, it should have been trenched in the previous Autumn. Sow the main crop of Red Beet in September. Sow in drills eighteen inches apart, and thin the young plants to ten inches. The crop will be matured and may

remain in the ground till July, or it may be lifted and stored in sand or earth. In lifting, care must be taken not to break the tap root, otherwise they will bleed, and be much deteriorated in value as a vegetable or salad. One ounce will sow a row fifty feet long. White Silver Beet is grown for its leaves; it may be sown in February for use during Winter and the following Spring. Sow in drills eighteen inches apart and one inch deep; thin out the plants to ten or twelve inches, according to the richness of the soil; it thrives best on a deep, rich soil.

Kale.—There are many varieties of this useful Winter vegetable, the best being the Dwarf and Tall Curled Kale, only differing in height. Sow in October for planting out in the end of November, for use in Autumn. Sow again in about six weeks for final planting in February; and March, for use during Winter and Spring months. The seed should be sown rather thinly for the purpose of securing robust plants. When ready for planting out, give the seed-bed a thorough soaking of water or liquid manure the evening previous to pulling for planting out, which should be done in showery weather if possible. If dry, give the plants a good soaking when planted every two or three days for a week or so. Plant in rows two feet apart each way—the last planting may be a little closer.

Broccoli.—There are many varieties, all good in their way, but for general cultivation the following will be found to answer for successional planting:—Commence to sow Veitch's Self-protecting Autumn in October, followed by Snow's Superb White, to be sown at intervals from October till the beginning of December; followed by Early Penzance, Elleston's Mammoth, and Knight's Protecting. Select a clean piece of land, mark it off into a bed three feet wide with an alley at each side for the convenience of weeding; or the seed may be sown thinly in drills, nine inches apart, when the hoe can be used. Take care not to cover the seed too deeply. A quarter of an inch of soil will suffice. The seed-bed will have to be protected from birds by a wire netting or by cotton thread wove backward and forward. Birds will not approach seeds so protected. As the young

plants grow, give them an occasional light dusting of slacked lime or soot, which will destroy slugs. Of recent years the diamond back moth has been so destructive in some districts that it has become almost impossible to raise or grow any of the cabbage tribe after the beginning of January. A quarter of an ounce of any of the cabbage tribe would furnish plants sufficient for any ordinary garden. English books on gardening recommend that the young plants should be pricked out into a seed-bed previous to planting out. No doubt this is the correct way, but the Colonial practice is to plant out direct from the seed-bed. For small suburban gardens, it may be more convenient to purchase the plants ready for planting out; but care must be taken to deal only with known parties, as the result of the whole year's operations may be frustrated through obtaining plants which have been raised from spurious or old seeds. October sowings may be planted out in December, and the others in succession, as they become fit, the late crops being put out in February. Any loamy, well-manured soil will suit. Plant in rows two feet six inches apart, and two feet in the rows. The after culture will consist of hoeing between, and drawing the mould up about their stems. Liquid manure may be given with great advantage once a week. It is an excellent plan to cut off the ends of the roots (the tap roots) and dip them in a mud composed of cow manure, earth, and a little soot. These remarks apply equally to all the cabbage tribe. If a dust of superphosphate be added, all the better.

Brussels Sprouts.—This is, perhaps, one of the most delicious of the cabbage tribe, as well as being one of the hardiest, it should find a place in every garden. Scrymger's Giant and Dalkeith are sure croppers. Sow the seed in September and October—same treatment as that recommended for broccoli, except that they may be planted a little closer. Any deep, well-manured soil will answer. Plant out as required. The sprouts are fit for use chiefly in Winter and early Spring.

Cauliflower.—A sowing may be made in March, in a warm, sheltered spot; these will be ready for planting out

by the end of August and September. The main crop should not be sown till August or September, to be followed by successional sowings at intervals of four weeks, till November. A quarter of an ounce of seed will supply more than enough plants for any ordinary garden. For Autumn cropping, the Walcheren and Veitch's Autumn Giant ; for Spring, Early London, Erfurt, and Mammoth ; and for Summer, the Asiatic and Alma will prove good standard varieties. The culture is the same as that recommended for broccoli. Cauliflowers are greatly benefitted by an application of liquid manure once a week.

Cabbage. — Little may be said of this generally-cultivated vegetable, except to name a few of the best varieties, which are Early York, Enfield Market, Large York, Nonpareil, Sugar Loaf, and Wheeler's Imperial. Make a sowing in February, and again in March, for planting out in the early Autumn and Spring. Plant in rows, two feet apart and eighteen inches plant from plant ; for the larger varieties more space must be allowed. Sow again in August and September, and plant out as required, following the instructions given for broccoli. Cabbages are gross feeders, and therefore require an abundance of rich manure.

Carrots thrive best on deep sandy loam, which must however, be rich, having been manured the previous Autumn. Manure should never be applied with this crop. Carrots may be sown from August to September. Nantes Horn and Early Short Horn. Sow thinly, in drills not less than twelve inches apart, rubbing the seeds between the hands, with a little sand or dry earth, for the purpose of breaking the hooked awns—which hold the seeds together—otherwise they cannot be sown regularly. Seed already divested of its awns may now be had from any seedsman. An inch of covering will be sufficient, beating the ground gently with the back of the spade or rake—particularly if the soil is dry at the time of sowing. The hoe must be kept going between the rows immediately the crop shows over ground, for the double purpose of destroying weeds and keeping the moisture in the ground. When the

plants have three or four leaves they will require thinning to four inches apart. One ounce will sow one hundred feet.

Celery.—Laing's Mammoth Red, Seymour's Giant White, or Sandringham Dwarf White are all good varieties. To produce celery of the best quality, the plants must not be checked in their growth. Celery may be sown in boxes, but the more usual plan is to sow in a seed bed as directed for broccoli. A good plan is to make up a bed of rich compost on a hard well-rammed bottom, such as a walk, covering it with soil from four to six inches deep; by this plan the plants cannot send down their tap roots, they accordingly form a bunch of fibrous roots, and may be transplanted from the seed bed into rows where they are to grow. This plan answers admirably; a small pinch of seed will furnish plants enough for any ordinary garden. A light, rich, moist soil is more suitable for celery than heavy retentive soil, however rich it may be. Although the plants require plenty of water and occasional applications of liquid manure during the growing season, they are apt to rot in Winter if saturated with moisture. Celery is usually grown in trenches, which should be four feet apart. The earth is thrown out on each side to the depth of twelve or eighteen inches, according to the nature of the soil; dig and fork in four to six inches of the richest manure procurable, which must be well rotted; if this is not procurable a dressing of bone dust will answer—one pound to every four yards, half this quantity with moderately good manure will suffice. As soon as the plants are large enough to handle they may be planted out in rows, nine inches apart, and shaded from the sun, uncovering them each evening till they take good hold of the ground. As the plants advance they will require to be earthed up a little at a time, once a fortnight, taking care not to earth over the centre of the heart.

Cucumber.—Rollison's Telegraph for the frame, and the long and short prickly varieties for the open ground, have proved themselves to be sure croppers. If it is desired to have early cucumbers, heat must be provided.

A hotbed may be formed of stable litter, to be turned two or three times before finally forming the bed ; this will prevent too violent heating. The bed may be four or five feet high at the back, and three to four feet in the front ; the length and breadth must be determined by the size of the frame at hand. The bed cannot be trodden down too much, the firmer it is made the longer it will retain the heat. The bed should be made a foot wider all round than the frame intended to be placed upon it. Place the frame on the heap, and fill in six inches of rich, mellow soil. As soon as the bed has somewhat subsided the seed may be sown, or the plants, which may have been previously raised in pots in heat, may be planted in August or September, watering freely and shading, having due regard to ventilation every warm day, taking care to close up early in the afternoons. It is a good plan to have a thermometer plunged two or three inches in the soil inside the frame, by this means the heat can be regulated by ventilation or by keeping close a packing with more stable manure. As the fruit shows, stop one joint above it. Amateurs will do well to rest content with growing cucumbers out of doors, as those grown in heat as described require more attention than amateurs could usually afford. For open-ground crops the long and short prickly cucumbers should be selected. Any well-sheltered, sunny spot, richly-manured will answer. Sow five or six seeds two inches deep, in clumps five feet apart, in scooped out hollows two feet in diameter and four inches deep ; the object being to have a receptacle to hold water when the plants require it. Plants raised in boxes or pots may be used, but seeds sown in the soil are more certain. Sow from the middle of October to the end of November. Keep a sharp look out for slugs and birds, an occasional dust of lime will secure the plants against slugs. Excellent crops of cucumbers may be produced if planted amongst cabbages and irrigated occasionally.

Capsicum (Chili and Long Red).—The first of these is used for pickling when green ; for mixing with other pickles ; for placing in vinegar, so as to form Chili vinegar ; and for grinding, when ripe, for pepper. Unless in warm situations it does not often ripen sufficiently. In the North

Island they ripen freely in the open air. In the South Island the seed should be raised in heat, and the plants, when hardened off, may be planted out in November in warm sunny situations. The seed may be sown instead of plants.

Cress.—There are two varieties, plain and curled leaved. These may be sown in small quantities any time between August and April, covering with half-an-inch of fine earth. This excellent blood purifier should be grown in every garden particularly in the early spring. One ounce will sow twenty feet of a row four inches wide.

Endive.—Used in salads. This plant has almost disappeared from Colonial gardens; a small quantity should, however, be grown for use in soups and stews. The green curled may be sown for the main crop, and the white curled for Summer and Autumn. A light, dry, but rich soil is most suitable for this crop.

Egg Plant.—This is a decorative plant. Treatment same as for capsicums.

Garlic.—Autumn or early Spring is the best season for planting. Plant the offsets or bulbs in rows twelve inches apart and six inches in the row, one inch deep. They will be ready for taking up as soon as the leaves begin to wither, which will be about December or January, according to the season, when the bulbs must be raised and left out till dry, then to be tied up in small bundles and kept in a cool place.

Shallot.—The directions given for cultivating garlic are entirely applicable to shallots.

Gourd.—Pumpkin, water melons, or vegetable marrow will grow in any rich light soil. Sow in October as soon as danger of frost has passed. Plant two or three seeds within a foot of each other in clumps eight feet apart, and thin out to one or two plants. All that is required for the successful culture of these most useful vegetables is that the soil must be as rich as it can be made—the site of an old hot-bed is best. They require no after attention. A sixpenny packet of any of the above will suffice. One good plant of

each will suffice for a small garden. Gourds, pumpkins, and vegetable marrows may be used as green vegetables, or allowed to ripen to be stowed away for Winter cooking.

Horse Radish delights in a rich, deep soil. It is propagated either by seeds or by sets, provided by cutting the main root into lengths of two inches. The tops, or crowns of the roots, form the best sets. They may be planted in May or August, in trenches eighteen inches or two feet deep, in dry soil. The roots will be ready for use the second year after planting. A few plants will suffice for most gardens.

Leek.—The best varieties for general use are the London Flag and Musselburg. Sow in September for transplanting in December and January. Endeavour to lift with ball of earth so as to injure the root as little as possible. This will best be effected by giving them a copious watering the evening previous to removal from the seed row. Plant in a shallow trench. The rows should be eighteen inches apart, and the plants twelve inches in the rows; plant with a dibble (a planting stick), making a hole deep enough to insert the young plant up to the leaves, taking care not to cover the crown—to be earthed up as they grow. The soil cannot be too rich. An abundance of water or liquid manure will very much add to the size, colour, and mildness of this vegetable. Another and less troublesome plan is to sow the seed in a wide drill three inches deep, covering the seed with two inches of soil. When the young plants have grown five or six inches high, thin them out to six or nine inches, and earth up as they grow. One ounce will sow 100 feet.

Lettuce.—All the Year Round, Drumhead, and Neapolitan Cabbage, Wilmot's Giant, and London White Cos, are all excellent varieties. They may be sown in small quantities once a month throughout the season, from August till March or April. Like all other salads it thrives best in rich, moist soil. Sow in drills fifteen inches apart, and thin out to one foot. Lettuce may be transplanted, choosing showery weather. A quarter of an ounce will sow a fifty-feet row.

Melons.—A very long list of names might be given, but Munroe's Little Heath, Turner's Scarlet Gem, and Gilbert's Green Flesh are good varieties. Melons can not be grown with any certainty out of doors, except in the warmer parts of the North Island. They can, however, be grown with heat supplied by a hot-bed (see directions for growing cucumbers in beds). They, however, differ from cucumbers inasmuch as they require much more sun to bring the fruit to maturity.

Mint.—Spear Mint for soups, salads, and mint sauce. Any soil will suit. If not looked after it will soon spread beyond its proper bounds. A good bunch will suffice for culinary purposes. If grown in a kerosene tin plunged in the soil it will not spread and become a nuisance. It should be gathered when in flower, dried, and hung up in a dry, cool place for Winter use.

Mustard and Cress may be sown throughout the season, beginning in August, and ending in March. Make small sowings once a fortnight, on rich soil, covering the seed with a quarter of an inch of fine soil. It will not be necessary to sow in drills, as the crop remains so short a time on the ground that weeds have not time to grow. One ounce will sow twenty feet of a row four inches wide.

Onions.—White and Brown Spanish, James' Keeping, Zitteau Giant, Giant Rocco, and Silverskin will be found good varieties for general purposes. Sow in August or September for the main crop, and again in October for salading during the Summer, and Silverskin Onions for pickling sow in February or March to stand the Winter, for Spring and beginning of Summer. Sow in drills twelve inches apart. As soon as the young plants appear above ground, run the hoe between the drills to kill seedling weeds. If the seed comes up thickly and large bulbs are required, thinning will be necessary in about six weeks after sowing, thin out to four inches apart; if large bulbs are not required, thinning need not be resorted to, in which case the result will be that a sufficient number of large bulbs will be secured, the balance being small will be useful for pickling.

When the crop has nearly finished growing, it is a good plan to bend down the stems flat on the ground with the foot. This operation has the effect of causing the bulbs to grow larger, it also prevents any of them from running to seed. As soon as the crop is quite ripe let it be taken up at once; if left in the ground afterwards, they will soon start to grow, which completely destroys their keeping qualities. To grow onions successfully the ground must be deeply trenched and well manured. Before sowing the seed, however, the soil should be firmly tramped or rolled to a firm surface, and again tramped after sowing the seed. James' Keeping and Brown Spanish Onions are the best for storing for Winter purposes.

Silverskin onion is the proper variety for pickling, the seed should be sown thickly on rather poor land and should not be thinned. One ounce will sow a row of seventy feet.

Onion Potato, or Underground.—This variety is not much cultivated in this colony; it is, however, worth a place in the garden. It produces a cluster of bulbs or offsets. It is propagated by offsets from the root of moderate size; plant in August or September. The bulbs should be inserted in drills twelve inches apart each way, the top of the offset just level with the surface. They attain their full growth towards the end of January. For immediate use they may be taken up as they ripen, but for keeping, a little before they attain perfect maturity. The only advantage to be gained in cultivating this variety is that it furnishes a supply for culinary purposes at least a month sooner than the general crop.

Parsnip.—Hollow Crown and Student are the best in cultivation. The soil cannot be too deep and rich for this crop. The manure should be applied the previous Autumn, if manured at the time of sowing the roots will be rusted. Sow in August and September, in drills fifteen inches apart, and half an inch deep, covering and firming the soil round the seed with the back of the rake or with the feet. When the seedlings are two or three inches high, thin to nine inches

apart, and keep the hoe constantly going to destroy young weeds. The crop may with advantage be left in the ground till the end of July, and taken up as required during the Winter ; if left longer in the soil they will commence to grow and will then be useless. One ounce will sow a row 100 feet long. •

Parsley.—Sow in September, in drills quarter-of-an-inch deep. As soon as the plants begin to send up flower stems they should be cut close down ; and again, in Autumn, if they have become strong and coarse. This will cause them to shoot afresh. One ounce will sow a row of 100 feet. Sow the curly variety.

Peas.—For first sowing, William the First (three feet), Kinner Gem (two feet and a half), McLean's Little Gem (eighteen inches), Multum in Parvo ; late and medium, Yorkshire Hero (two feet and a half), Veitch's Perfection (three feet), Epicurian (three feet), are all good croppers. Sow from August to middle of December. Peas thrive best in light loamy soil. Commence sowing in August and continue throughout September and until December once every three weeks. A pint at a sowing will suffice for a moderate-sized family. Sow the dwarf varieties in drills two feet six inches apart and two inches deep ; the tall-growing kinds will require three or four feet. If the seed is good they may be dropped two in an inch for dwarfs ; tall-growing kinds may be dropped one inch apart. When the plants are two or three inches high the rows should be hoed between, and the earth drawn up to each side of them. Staking is not required until the plants show their tendrils. As these successional crops ripen they should be immediately cleared away, the ground dug over and planted with cabbage, broccoli, cauliflower, or Brussels sprouts. One pint of dwarf peas will sow a drill sixty feet long, and eighty feet of tall varieties. Birds are very destructive amongst peas as they appear over ground, a simple and fairly effective remedy is to stretch cotton threads along the rows, six or seven strands tied to sticks, a couple of inches from the surface of the ground, and at each side and over the peas.

Potato.—The varieties are too numerous to be named. The following will, however, be found good early ripening sorts and keep well:—Walnut-leaved, Royal Ash-leaved, Snowflakes, Early Lapstone Kidneys. A dry, pliable, fresh soil in good heart, is the best for growing potatoes. In warm, well-sheltered situations a first planting may be made in July, and again in August, provided the aspect is warm and well-sheltered from cutting winds, and up to November for late crops. It is a good plan to plant when sufficient ground is dug for receiving a row, in rows two feet apart and twelve inches set from set, planting the seed as the digging proceeds. By this means tramping in the soil will be avoided, which is a great consideration for early planting. Plant six inches deep. For very early planting use whole potatoes, weighing from two to three ounces, about the size of a hen's egg. If sets are used, let each one have not less than two eyes. Hoe as soon as the plants are well over ground, and earth up. This is more particularly necessary for early crops, to save them from cold cutting winds. It is a good plan to spread a little litter lightly between the rows as a preventative against frost. As the early-planted crops are removed from the soil, the ground should be freshly dug and sown with peas, turnips, or planted with cabbages, cauliflowers, or French beans, as required. One peck of potatoes will plant a row 100 feet long cut into sets with two eyes in each set.

Radish.—French Breakfast, Long Scarlet, Short Top White, and Red Turnip, are the best for general cropping. French Breakfast is the best. For Autumn and Winter varieties, White and Black Spanish. These latter varieties are not grown nearly so much as they deserve to be. Radishes may be sown from July to March, at intervals of three weeks. The ground must be fairly dry and friable when the seed is sown. A quarter-of-an-ounce at a time will suffice. The ground should be rich and thoroughly well pulverised; manure should not be applied at the time of sowing, except a dust of bonedust or superphosphate. Cover the seed a quarter-of-an-inch, beating the bed with the back of the spade or shovel, finishing off with the rake, and protect from birds. These seeds may be sown

broadcast, as they occupy the ground only for a short period. During dry weather water should be liberally supplied in the evenings. This applies to all kinds of saladings.

Rhubarb. — Wyatt's Victoria, Royal Albert, and Mitchell's Early Albert are good early and late varieties. Rhubarb thrives best on deep, rich, moist soil heavily manured. It may be planted in June, July, or August. Plant in rows four feet apart and three feet in the rows. Half a dozen plants will suffice for an ordinary family. Rhubarb may be grown from seed sown in September. It is better to purchase a few roots, which will produce a crop of leaves the same year. Rhubarb may be forced by driving stakes into the ground, say three or four round each plant, inclining together at the top; surround these with stable litter, leaving the top open. Chimney pots, cement casks, or boxes with the bottoms knocked out, will also answer for forcing purposes. Rhubarb may be forced without either pots or frames, by merely covering the plants six or eight inches deep with light litter, but stakes or cement casks are best. Flower stems should be broken down as they appear. Continue pulling the leaves for use as required till November. The more they are stripped after this date, the less productive they will be next year. As soon as the leaves have withered away, fork round about the plants, applying a good dressing of rotten manure if available.

Rhubarb may be propagated by lifting the old stools and dividing them into quarters, taking care that each quarter has at least one strong crown. Plant as above directed. In dry weather a good soaking of water or liquid manure will be of great service. Four ounces of superphosphate to three gallons of water is a good dressing, equally suitable for all kinds of vegetables while in vigorous growth.

Sea-Kale delights in a deep, rich soil. It is a native of the seaside and therefore, like asparagus, it should be dressed occasionally with common salt. It may be raised from seed sown in September; in drills three feet apart, and finally thinning the plants to two feet apart in the rows.

Liquid manure applied once a week to the growing plants, will improve its growth very much. The better plan is to purchase one-year-old plants, and plant them three in a clump, three feet clump from clump, and eighteen inches plant from plant. Excellently blanched sea-kale can be produced in the Spring months by covering the crowns with coal ashes mixed with short stable litter about fifteen inches deep. This should be done in July or August.

Spinach. — The Round-Leaved (or Summer) and Prickly-Seeded (or Winter) are the varieties most generally cultivated. Spinach luxuriates in a rich friable loam, enriched with well-decomposed manure. Sow in August or September, and again in November. Sow in drills eighteen inches apart, covering the seed half-an-inch. Sow the Prickly or Winter Spinach in February or March in moist weather. The outer leaves only should be gathered at a time, the centre being left uninjured to produce successional crops. This direction applies chiefly to the Winter standing crops; those of the Summer may be cut off close two or three inches from the ground. Successional sowings will only be necessary where large supplies are required. One ounce will sow sixty feet of a drill.

Spinach, New Zealand.—This plant is sometimes used as a substitute for Summer spinach—it is not, however, recommended, although it is an excellent substitute. The seed may be sown in September or October, in drills three feet apart, in rich soil, and thin out to two feet apart. A dozen or twenty plants will afford an abundant daily supply for a considerable period. It will be ready for use in five or six weeks after sowing.

Sage thrives in any light, friable soil. It is propagated by cuttings of the preceding or same year's growth; if of last year's growth, plant in October; but, if of the latter, not until December. The strongest shoots should be chosen, and cut six inches in length, trimming the lower leaves. Plant in rows six inches apart, four inches deep, in a border facing south, choosing showery weather. Water when dry.

Thyme.—Thyme thrives best on rather poor soil. It is increased by taking up an old plant and tearing it in pieces. This may be done in March, April, or August. The plants require renewing every three years. Plant out in August or in March.

Turnip.—Early Snowball, Early White-stone, Extra Milan Strapleaf, and Golden Ball are all good varieties. A first sowing may be made in September, to be followed by another in October, and again in January and February; should the soil be dry and the weather hot it will be useless to sow under such conditions. Turnips thrive best in a light, rich loam. Sow thinly, in drills twelve inches apart. Thin the plants to six or nine inches when they have four or five leaves. A sowing may be made broadcast in March, these may not bulb but will make excellent Spring greens when they begin to run to seed in August. They are particularly wholesome at that season of the year. One ounce will sow a row 150 feet long.

Tomatoes thrive best in a rich, light soil. They are particularly susceptible to frost, and should not be planted out till the end of October, safer still in the middle of November, when all danger of Spring frosts has passed. The best varieties to grow for culinary purposes are The Large Red and Key's Early Prolific. Sow the seeds in pots or boxes in a greenhouse or frame, in September, and as soon as the young plants are tall enough to handle they should be transplanted into shallow boxes or into three- or four-inch pots, and watered well and shaded. They will soon strike, and should then have plenty of sun, moisture, and air till the time appointed for planting out. This may seem a troublesome plan, but it will repay the care. They may also be taken from the seed box and planted out where they are to grow, but this is a bad practice. Tomatoes cannot have too much sun, in fact they will not ripen properly lacking heat. Plant in rows four feet apart, the drills running north and south, so that both sides will have the full sun all day long. Train to a trellis three feet high, or stake in the same manner as peas. As the plants branch out, let the side shoots be thinned out and shortened

back to the joint just above the blossom bunches, cutting back all superfluous and weakly branches. After the fruit has been well formed, the superabundant leaves may also be thinned out, exposing the fruit as much as possible to the sun. The small green fruit, no larger than marbles, form a most excellent pickle. Green tomatoes may also be preserved as chutnee.

Manure for the Vegetable Garden. — The foundation manure must ever be stable or farmyard, well decomposed or dug in, in the fresh state, in Autumn. My experience teaches me that fresh manure should never be applied *with* the crop, especially if the crop is to be carrots and parsnips, for the reason that when the roots come in contact with the fresh manure, I have invariably found them rusted and inclined to fork; and not only so, but the soil is kept too porous in Summer. My own practice is to manure heavily with stable or farm-yard muck once in four years, using artificial fertilisers, principally bonedust, during the intervening years, in the following proportion: 3 lbs. of bonedust and $\frac{1}{2}$ lb. salt to the square perch, dug in in August, for all kinds of garden crops. At the time of sowing the seeds I scatter a little superphosphate or fine bonedust immediately in contact with the seed, at the rate of 2 lbs. for every 70 yards, which means 2 cwt. per acre (assuming that the drills are 22 inches apart). The ashes of burnt weeds and soot may with great advantage be applied during the growing season, scattered between the drill and hoed in, Animal guano, Peruvian guano, and dried blood (blood manure is the cheapest form of nitrogenous manure obtainable in New Zealand), being more rapid in their action, are best adapted for salading and all plants requiring a rapid growth. One year in four I apply a dressing of fresh slacked lime in addition to the bones at the rate of 28 lbs. per square perch, = 2 tons per acre. Should the soil be too dry when planting out cabbage, cauliflower, or broccoli, get half a bucket of cow dung or any other rotten manure with a little soil, add a handful of blood manure or superphosphate, fill up with water to the consistency of thick paste, dip the roots of the young plants in the compound, they will carry into the soil a coating of mulch which will give them a

good start. This method should never be neglected in dry planting seasons.

Compost heap.—A good gardener will always have a compost-heap where all refuse matter may be collected, such as weeds, mowings of grass, etc. ; before, however, returning it to the soil, it should be mixed with sufficient stable litter to cause strong fermentation, for the purpose of destroying the vegetating power of weeds, which are sure to be present.

Peculiarities of Seeds.—The seeds of onions, cabbages, clover, and other small seeds generally are covered with a thin shell, and their vitality is lost by the drying of the vegetable oil which they contain. Fresh seed may be known by placing it between the teeth, when the oiliness will be apparent, while old seed will feel gritty. Some of the processes for “renewing” seed are based on this fact. The renewal is effected by rubbing the seed in oiled flannel to make it look and feel fresh. A small magnifying glass, however, will show the oil adhering to the shell. Carrot and beet seeds, when fresh, have a greenish yellow tinge, and feel soft. When old they are quite yellow. Lettuce seed turns white with age. Carrot seeds are only good one year after growth ; cabbages from two to six years ; onions, two years ; beets, one year ; radishes, two or three years ; and cucumbers and melons, three years. This is with the proviso that they have been well kept.

Rotation of Crops in the Vegetable Garden.—Experience and observation have long since demonstrated that, it is not possible to grow the same kind of plants in the same land for an indefinite period without deterioration both of soil and the plants. Analysis has shown that different crops require different constituents—for illustration. All plants of the cabbage or turnip tribe require phosphates, hence it is that turnips and cabbages give best results from phosphatic manures. Potatoes, on the other hand, require more potash, hence it is that seaweed and kainit give the best results when used with this crop. Were an abundant supply of well made farm-yard manure from well fed horses and cattle available, there would be little need for rotating crops or for

the multifarious artificial manures now on the market. In the absence, however, of this valuable ingredient, rotation must be resorted to in all well-ordered vegetable gardens, as it is on well-conducted farms.* The following definition of a rotation suitable for a vegetable garden is by Messrs. Sutton and Sons, the well known seedsmen. It is thoroughly practical and will be found applicable to gardening in New Zealand. In reply to the question—What is a rotation of crops? They reply that it is the ordering of a succession in such a manner that they will successively tax the soil for mineral aliments in a different manner. A good rotation will include both chemical and mechanical differences, and place tap-roots in a course between surface roots, as for example—carrots, parsnips and beets after cabbage, cauliflower and broccoli; and light, quick surface crops, such as spinach, to serve as substitutes for fallows. The cropping of the kitchen garden should be, as far as possible, so ordered that plants of the same natural families never succeed one another; and, above all things, it is important to shift from place to place, year after year, all the cabbages and the potatoes, because these are the most exhaustive crops we grow. In a ton of potatoes there are about twelve pounds of potash, four pounds of sulphuric acid, four pounds of phosphoric acid, and one pound of magnesia. We may replace these substances by abundant manuring, and we are bound to say that the best rotation will not obviate the necessity for manuring; but even then it is well to crop the plot with peas, spinach, lettuce, and other plants that occupy it for a comparatively brief space of time, and necessitate much digging and stirring; for these mechanical agencies combine with the manure in preparing the plot to grow potatoes again much better than if the land were kept to this crop only from year to year. If we could mark out a plot to permanent crops—such as asparagus, sea-kale, and rhubarb—and on the other three keep the crops revolving in some such order as this: No. 1, short-lived crops, such as peas, spinach, and saladings, to be followed by cabbage; No. 2, tap-roots, such as carrots, parsnips and beets; No. 3, potatoes, turnips and onions. In the next season the

*The Culture of Vegetables and Flowers, Sutton and Sons, Reading, England, 1895.

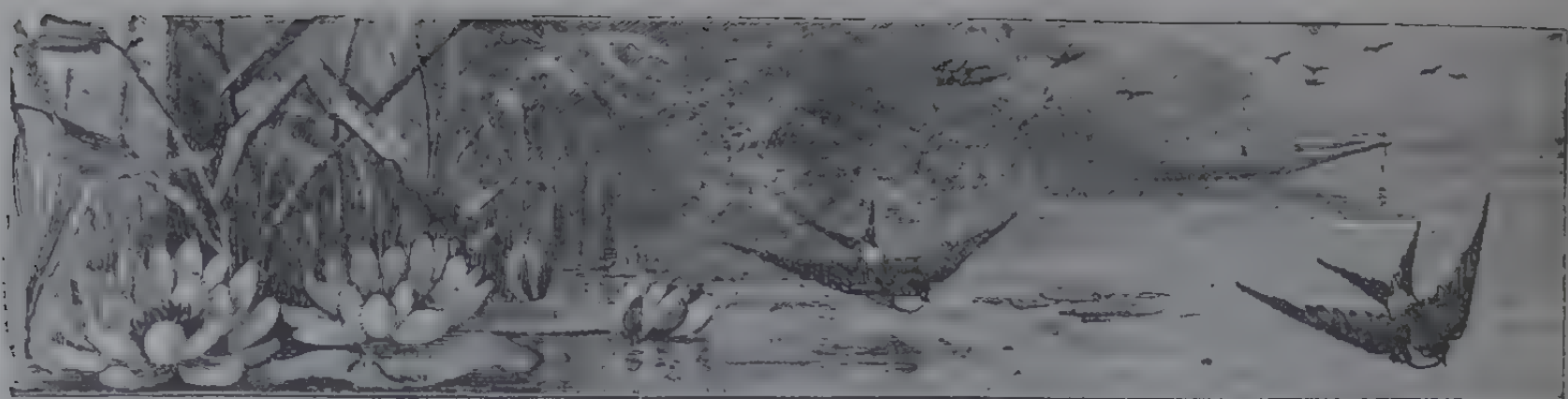
original No. 2 would be cropped as the original No. 1, and the original No. 3 as No. 2. In the next year the original No. 3 would be cropped as the original No. 1, and so on; every crop to be prepared for by vigorous stirring of the ground and liberal manuring, and if the subsoil were good we should trench it two spits deep for every root crop.

Chemistry of Garden Crops.—The same authors group the principal garden crops in two classes.

In Class I. phosphates and potash predominate, including the following:—The pea, containing phosphates, thirty-six; potash, forty. Bean: phosphates, thirty; potash, forty-four. Potatoes (tubers only): phosphates, nineteen; potash, fifty-nine; soda, two; lime, two; sulphuric acid, six. Parsnip: phosphates, eighteen; potash, thirty-six; lime, eleven; salt, five.

In Class II. sulphur, soda, and salt predominate. including the following:—Cabbage: phosphates, sixteen; potash, forty-eight; soda, four; lime, fifteen; sulphuric acid, eight. Turnip: phosphates, thirteen; potash, thirty-nine; salt, ten; lime, ten; sulphuric acid, fourteen. Beet: phosphates, fourteen; potash, forty-nine; soda, nine; salt, twenty; lime, six; sulphuric acid, five.





THE ORCHARD AND THE FRUIT GARDEN.



N selecting a piece of land for a garden or orchard, there are two extremes which should at all times be avoided. The one is when the soil and subsoil are too retentive of moisture ; the other, when the soil is so sandy and poor, that the roots become exposed to sudden droughts. In the former case the trees become choked with lichens, and the points of the branches die prematurely, and the fruit is starved and stunted. If possible, select land intended for fruit trees free from either of the above extremes. A deep, rich, sandy loam is the most suitable, with a strong clay loam for the subsoil. If of sufficient depth, let the land be trenched two or three feet deep, as directed for the vegetable garden. Should that method be considered too expensive, a deep ploughing followed by a subsoil plough in the same furrow will answer admirably, breaking up the subsoil but leaving it below.

The Planting Season for all kinds of fruit trees commences in April, or as soon as the leaves begin to fall, provided the soil is in a mellow state. In the case of cold retentive soils—which, however, should be avoided unless

they can be thoroughly drained—the business had better stand over till Spring; but the ground may be roughly trenched and left exposed to the Winter frosts and rain, and be much improved for planting purposes; and then planting may be continued up to the end of August, after which the work should cease. Nothing can be more injurious, either to the present or future success of the trees, than to bury the roots away from the influence of heat and air; so long as the roots are sufficiently covered, so as not to be exposed to the direct influence of the air, they have all that is necessary for their prosperity. There are, however, some essential points to be kept in view in forming an orchard, which, if not attended to, must lead to failure. The soil should be deep and dry; the situation should be well sheltered, if not naturally, artificial shelter must be provided.

Shelter Belts. — Where space is plentiful and land cheap, a belt of trees may be planted, extending round the orchard, or at least round those portions exposed to the strong prevailing winds. *Cupressus Macrocarpa* may be planted on the outer edge, to act as nurses, to be cut out when the deciduous trees have grown sufficiently. The inner rows to consist of ash, oak and elms; the oaks predominating. The belt should not be less than one and a half chains wide—two would be better; the trees to be planted in alternate rows ∴ ∴ ∴. A row of walnuts may be planted next the orchard, fifty feet apart. These in themselves will form good shelter, and will yield abundant crops after a few years. The inner row of shelter trees should be at least one hundred feet from the fruit trees. Deciduous trees are recommended for shelter belts for orchards, for the reason that while evergreen trees answer admirably in Summer, they shelter the fruit trees too much from the blasts of Winter, thereby offering a safe refuge for blights of all kinds.

Apples (Varieties to Plant). — The majority of fruit-growers cultivate too many kinds of apples. Ascertain, if possible, what kinds have been proved by experience best adapted to soils similar to your own, and then confine yourself to a few of the best of these varieties.

The Selection of Fruit Trees is a matter of the utmost importance. It is well to remember that a good tree occupies no more room than an indifferent one. Never plant a poor specimen or an inferior variety: such trees are dear at any price. The best safeguard is either to grow them yourself from the pips and graft them, or to deal only with a nurseryman who has gained for himself a good repute for clean stocks, well-formed trees, and true to name; this is the safer plan. Far better pay 25 per cent. more to such a man, than buy at a much cheaper rate where the same care has not been taken in working up the stock for sale. A few really good varieties will be found more profitable than a large number of mixed kinds. It must, however, be observed that in a country with such a range of longitude and climate as that of New Zealand, it is impossible to give a list of apples which will be found suitable for all districts. All that can be done is to recommend a really good selection of dessert, cooking, and keeping apples. Should any of them prove failures, let them be cut back and grafted with a variety which has proved itself suitable to the district. This is a better method than rooting up the tree and planting another; for the reason that a couple of years at least will be gained by adopting this plan. The following list, with accompanying remarks, have been supplied by Mr. Adams, of Greendale, Canterbury, who has for some years past been testing the qualities of over four hundred varieties of apples in his orchards. He says: The following dozen have proved the most profitable, taking all things into account. They ripen in the order given.

1. Red Astracan—A very early variety.
2. Irish Peach—A regular bearer, and free from American blight.
3. Gravenstein—A fine habit of growth, comparatively free from blight.
4. Benoni—Of good habit; apt to overbear; the fruit must be thinned or it will be small.
5. Cellini—A handsome fruit, and good cropper.

6. Nelson Codlin—Always fruits well ; fruit smooth and fair.
7. Prince Bismarck—A most profitable apple ; not much attacked by scale.
8. Wagener—An American apple of finest quality ; an enormous bearer ; not much subject to American blight ; adapted for small gardens as it makes but little wood.
9. Scarlet Nonpareil—First-class dessert.
10. Wooling Favourite : a variety of Beauty of Kent—one of the most beautiful as well as profitable of apples ; not easily shaken from the trees.
11. Rome Beauty—An American apple ; a grand cropper, and good keeper ; with exceedingly showy fruit.
12. Morgan's Seedling—A good bearer ; very suitable for small gardens.
13. Boston Russet—a heavy cropper.

Dessert Apples—The same authority has selected the following twelve varieties as of first quality all the year round : Early Joe, Kerry Pippin, Mother, Ribston Pippin, Cox's Orange, Melon, American Golden Russet, Wagener, Marston's Red Winter, Romanite, Scarlet Nonpareil, Russet Nonpareil, Newton Pippin, and London Pippin.

Keeping Apples.—The following have been selected : Stone Pippin, Stephenson's Winter, Newtown Pippin, Winter Strawberry Pippin, Winter Greening, Rushock Pearmain, Kentucky Redstreak, Chronicle, Allan's Everlasting, Beefing, Cullasage, Lord Wolseley, and Winter Peach. This last variety will keep good for twelve months.

The following are six good dessert apples, which will keep through the Winter :—Boston Russet, Grimes' Golden Pippin, Jonathan, Margil, Sturmer Pippin, and Romanite. The following are six cooking apples :—Dans Maria, Lord Wolseley, Lane's Prince Albert, Prince Bismarck, Ohinemuni Pippin.

The largest apples are Mobb's Royal, Gloria Mundi, Twenty Ounce, Warner's King, Emperor Alexander, Peasgood's Nonsuch, Lady Hennicker, Lord Nelson, Beauty of Kent, Carter's Blue, Waltham Abbey Seedling, and Yellow Bellefleur, all of which are splendid exhibition apples, and in sheltered places most of them will be found profitable. Adam's Birthday, a fine dessert apple; Baron Ward, a long keeper; Norfolk Bearer, almost blight proof; Cornish Aromatic, a very showy apple; Rawles' Janet, and Shockly, two popular American apples, are remarkable for holding their fruit through the strongest winds.

There are two sorts of apples which sell well in the London market, viz., those for decorative purposes and those for dessert. Prince Alfreds and Alexanders are sought after for show. New York Pippins are the favourites, indeed all the pippins sell well; the Pearmain and Scarlet Nonpareils are also favourites. Those about to plant with a view to exporting, should plant largely of these kinds, it is a mistake to have too many varieties.

Planting.—Choose well-formed, young trees, two or three years old; insist on having them on blight proof stocks, which means that the roots should be free from blight (such as the Northern Spy), that blight proof scions should be grafted on the blight proof roots, and that ultimately the varieties of apples required should be grafted on these stocks. With such precautions, properly carried out, the trees will be free from American blight (or woolly aphis). Trees are frequently sold purporting to be so worked, which are really only worked above the ground, and which is little or no advantage at all. Strong and vigorous growing apples should be worked on Northern Spy stocks; the small and weakly growing varieties, on the Majetin. Young trees should be lifted carefully, and, before planting, cut off every root that grows downward—the surface roots are the most valuable—take off all bruised or ragged ends with a sharp knife. Mark off your land for planting, placing a peg in the ground where each tree is to stand, in alternate rows ∴ ∴ ∴, twenty feet tree from tree, and twenty-five feet row from row. Some orchardists advocate

planting much closer and thinning out afterwards. The former plan is the better for permanent orchards. Make holes, not more than nine inches deep, and not larger than is required to admit the roots, place the tree in the centre, carefully spreading out the roots all round, then cover up with fine mould, treading gently but firmly with the foot. The stem must stand a little higher out of the ground than required, to allow for settling down. The surface should just cover the collar and no more. If the orchard is in an exposed situation, the trees will require staking as directed for transplanted trees. The soil must be dry at the time of planting: this is essential to success. If the trees have been well-formed from the nursery, they will require very little pruning for some years, beyond Summer stopping or pruning, which is the best treatment of all (see Summer stopping). During the early years of their growth, the trees should be encouraged to assume a bowl-shaped appearance, which can easily be done if they have been attended to from the first. The ground should be kept free from weeds or grass. The intervening spaces may in the meantime be cropped with roots for a few years; do not plant small fruits such as currants, gooseberries, or raspberries, which would prevent the free use of the drill grubber during the Summer months: it is a penny wise and pound foolish policy. Never use a spade within at least six feet of the stems. Use a flat-tined fork, similar to those used for digging potatoes, which will not injure the surface roots, which are essential to the production of the best fruit.

Pruning may be classed under three heads, viz:—Rest or Winter pruning, Summer pruning, and root pruning. A very great diversity of opinion exists on the subject of pruning apple trees; while some advocate a vigorous use of the knife, others condemn the practice. Our own opinion is that the knife should be sparingly used on young standard trees, which must, however, be worked into symmetrical form, and this should be done in the nursery; when this has been properly attended to, the only after pruning necessary will be to keep the centre of the tree as open as possible, and to remove all branches which have a tendency to grow out of their place, and shortening the young growth.

This may be achieved by the simple but much neglected system known as Summer pruning or stopping. If this is attended to, there will be little necessity for the knife.

At the Conference of Australasian fruit growers held in Wellington in May, 1896, Mr. Thompson, one of the Tasmanian delegates, speaking of the treatment of fruit trees, describing the Tasmanian mode of pruning, said that there are two methods of training apple trees—the long and short standards. The former, he said, had the advantage of allowing loose cultivation to proceed close to the trunk, but in other respects it is inferior to the short standard, which allows of the operations to be carried out from the ground or short ladder, and at the same time does not expose such a surface to the winds. We generally aim at a cup or base-like tree, removing the centre branches in order that the sun may have free access to the fruit. The most successful plan of pruning is that which induces the growth of fruit spurs round the main branches rather than in the more slender extension limbs. The fruit is not so readily shaken, a consideration which should recommend the system to New Zealand orchardists. It is now recognised that every kind of tree requires special treatment, and must be dealt with on its merits. It will thus be seen how difficult it is to speak definitely, or to make hard-and-fast rules for orchard pruning. Amateurs will do well to employ an expert, and, by paying close attention to his method for one season, they should be able to manipulate their trees in the future.

Other authorities tell us that large orchard trees, when in their prime, require very little pruning; once in three years may then suffice to regulate them. Their pruning will simply consist of a slight thinning out of exhausted or cross boughs, which, situated in the interior of the tree, cannot bring fruit to perfection, and, in bearing, rob the superior parts of the tree. When, however, the trees become somewhat aged, they require more attention; for when it is found that they cannot bring all the fruit which may “set” to perfection, it becomes necessary to sacrifice some portion, in order to throw strength into the remainder. As long as the tree continues to bear at all, the best fruit will ever be at the extremities of the boughs; nature, therefore, must be

followed, or rather in this case anticipated. Once in a couple of years the trees should be gone over, and much of the interior wood cut away. The wearing-out wood may readily be distinguished by its stunted character, and frequently by its dead parts, which may be taken as an indication of the breaking up of the constitution of the tree. There is no occasion to prune the extreme points; the removal of the larger decaying branches will suffice. It often happens, nevertheless, that a good deal of young annual spray grows out of the old branches; such, occasionally, should be thinned away, or it will decoy the sap from the more important portions of the trees. Winter pruning may be performed any time between May and the middle of August.

Root Pruning.—Apples or pears which are growing too rapidly, and whose roots have got into the subsoil, and which have ceased to bear large crops of fruit, may be greatly benefited by pruning the roots. A writer in *The Garden* gives the following practical instructions as to how this operation should be performed:—"A tree from ten to fifteen years old should have a trench cut half way round it at a distance of five or six feet from the bole. The trench must be deep enough to enable the operator to cut through all the roots; then take a fork and work well under the ball of earth, cutting off all roots that have struck deep into the ground. For the soil that has been thrown out, some from another part of the garden should be substituted; the new soil will be better for the tree than the old exhausted material. In applying the new soil endeavour to get the roots nearer the surface than they were before. The object in doing half the roots only is to prevent the tree from receiving too great a shock to the system. During the following season new fibres will be formed where the roots were cut, and the other half of the tree can be done the following season. When the work is done in this way there is no danger of the tree being blown over, nor will the crop of fruit be lost the first year after pruning."

Transplanting may with advantage be resorted to when young trees exhibit a tendency to make too much

wood and not many fruit spurs ; or in the case of trees which have got their roots into a cold ungenial sub-soil, and whose timber assumes a weakly appearance, being cankered or decayed at the points. By transplanting a too vigorous tree it will be thrown into bearing, and by lifting the unhealthy tree and planting it on the surface, health and vigour will in most cases be restored. In either case, care must be taken to lift the tree carefully, injuring as few of the fibrous roots as possible. The strong roots which have been broken off must be pared with a clean cut. In proportion as the roots have been destroyed while lifting, a corresponding quantity of the branches should be removed. When re-planting, spread the roots out carefully, and fill in with fine, dry mould, pressing the soil round the stem gently but firmly with the foot ; then drive a stout pointed stake firmly into the ground, a few inches from the stem ; to this fasten the tree with some soft material, such as soft rope or native flax. Some growers prefer three stakes driven in at equal distances from the stem (say two feet, fastening a piece of sacking loosely round the stem to prevent the band from chafing, passing a soft rope round this band, and tying to each stake in the following manner, the centre dot representing the stem of the tree. We have seen young trees almost barren rendered abundantly fruitful the following season after having been shifted. Transplanting may be done any time from May till August. A barrow load or two of manure or litter spread round each shifted tree will preserve the fibrous roots from being injured by drought or hot winds ; in dry weather a few buckets of water occasionally administered will be of benefit to the tree. This will only be necessary in protracted droughts.



Apples and Pears treated as Espaliers.—This mode of growing fruit trees requires constant attention and skill, it is therefore not suitable for amateur gardeners. A trellis four to five feet high, formed of battens, wire, or iron rods will answer, placed along the side walks three or four feet from the edging ; if iron is used the rods must be painted at least every three years or they will rust and look unsightly. To these the trees are trained as on a wall, with

this difference, that instead of being nailed, the branches are usually tied ; the fastenings should be soft hemp cords or strips of bass or native flax. Care must be taken not to tie the branches too tightly. (See summer pruning which is applicable to all kinds of fruit trees). In selecting trees for espaliers, it will be well to select those which have been worked upon *quince* or some other slow-growing stocks. Summer pruning and stopping is indispensable to successful fruit-growing under these conditions.

The Pear.—This delicious fruit does not receive the attention it deserves in Colonial gardens ; the reason probably is that it is rather longer in bearing than the apple, and not so certain a cropper, nor do they continue to bear certain crops year after year like the apple ; an abundant crop is usually followed by a sparse one. With judicious treatment this may in a great measure be obviated. Any good, dry soil will do for pears. By careful selection the ripening period may be extended over several months. The first point to consider is the stock upon which the pear should be grafted. Considerable diversity of opinion exists on this head, some recommending the quince, others again condemning it, and preferring the pear stock. Our opinion is that they are both good when the soil is suitable. The pear stock produces a stronger growing tree and more enduring than the quince ; but it is longer in coming into bearing. Rampant growing varieties should therefore be grafted on quince stocks, and the shy growers on the pear stock. Where the situation is naturally damp, and the soil rich in character, the quince will thrive ; but where it is very dry and sandy, it will make little progress, and the fruit will be small and gritty. Common observation will, however, easily enable anyone to determine whether the soil is suitable for the one stock or the other.

The mode of training is another subject deserving attention. If the espalier system is preferred, it must be remembered that it involves a considerable outlay in the first place if a permanent railing of iron is erected, and if wooden stakes are employed, then these are constantly giving way, and fresh ones are required ; endless expense is consequently

incurred. Dwarf standards, if properly managed, will obviate the use of these expensive props. If the ground is properly drained—an essential point as regards the flavour of the fruit as well as the productiveness of the trees—they may be planted ten or fifteen feet apart. Should they grow too vigorously—which is often the case with pears grafted on their own stocks—this may be counteracted by simply sticking a few strong stakes into the ground, to which the branches should be tied, drawing them gently towards the earth till the bark begins to creak. This system checks the flow of sap, and causes the formation of fruit buds. Lindley explains the phenomenon as follows:—"The effect of turning the branches of a tree from their natural position to a pendulous or horizontal one is to impede both the ascent and the descent of the fluids in a gradual but certain manner. The tissues of which branches are composed are certainly permeable to fluids in every direction, and there can be no doubt that the vital action of the vessels of a plant is performed both in the natural and inverted position. So long as that erect direction of the branches which is natural to them is exactly maintained, the flow of their fluids being subject to no interruption, will take place in the fleetest mannner possible; but the moment this natural direction is deviated from the vessels become more or less compressed, their motion is impeded, and finally, if the inversion is perfect, it becomes so slow that an accumulation of the proper juices necessarily takes place through every part of the system," resulting in the formation and development of fruit buds. If this treatment has not the desired effect, then judicious root pruning or transplanting must be resorted to. The most important point in the management of pear trees hinges on the Summer pruning. Many imagine that when the trees are planted there is nothing more to be done, except picking the fruit. During the Summer let the superfluous shoots be stopped back to within three inches of the old bearing wood—broken off rather than cut. This will cause fruit buds to be formed at the base of the shoots so treated. The projecting part can be removed in Autumn or Winter, close to the fruit buds. By following this mode of treatment the trees will be kept

within a limited space and their productiveness secured. The following varieties will be found suitable for general purposes :—Williams' Boncretian and Jargonelle, Marie Louise, Easter Beurre, Napoleon, Beurre-bosc, Beurre d'Amaulis, Winter Nelis, Autumn Bergamot, Pitmaston Duchess, Louis' Bonne of Jersey, Beurre Clairgeau, Beurre Baehlieu, Vicar of Winkfield.

Dwarfing Apples and Pears.—The dwarfing system of growing apple and pear trees can be strongly recommended for private gardens, where people require a variety of fruit and have a limited space in which to grow trees. Trees grown on the dwarfing system bear early and heavy crops, and can be planted from six to eight feet apart. The necessary conditions are—(1) A dwarfing stock. For the apple, that known as the Paradise is most frequently used ; but there are others. For pears, the quince stock is recommended. In each case the bearing variety must be worked sufficiently above the ground, so that there may be no danger of its striking roots of its own. (2) To successfully grow dwarf trees a careful system of summer-pruning must be adopted, and occasionally root-pruning may have to be resorted to.

To Cleanse Fruit Trees of Moss.—Not only the mosses and lichens which so generally affect fruit trees, but the eggs of insects, may be effectually destroyed by dressing them in winter with a wash composed of a solution of soft soap and common salt or brine. The trunks and large branches ought to be scraped with a scraper made of old hoop, and when all the scales of bark are removed, apply the mixture with a painter's brush, working it well into the crevices. This is much preferable to and not so unsightly as, washing with lime.—*Rural World*.

Almonds.—Any light rich soil will suit almonds. The same mode of treatment as that indicated for plums will suit for almonds. The Soft shell is the most generally useful. Almonds may be planted in rows inside the shelter belts to orchards next to the other fruit trees.

The Apricot.—This delicious fruit does not bear freely in all localities, it requires plenty of shelter and a deep moist soil, so long as stagnant water does not lie about the roots. It bears freely when planted against a wall or a house with any aspect, except that facing south. It however grows to a large size, and bears well as a standard in many localities. It may be planted from May till August, provided always that the soil is dry at the time of planting. As a standard it requires very little pruning, simply cutting out superfluous or exhausted wood. Apricots, treated as wall trees, like plums, are prone to produce coarse shoots; these should be pinched in during the Summer; if not done at that period they must be cut away during May, June, or July. The apricot, when in proper condition, produces, perhaps, more natural spurs than most of our fruit trees; and, although some kinds will blossom and bear on the young wood, yet on the true spurs we must mainly rely, for blossoms from the young shoots most generally develop imperfectly. The pruner, therefore, must, with some precision, cut away cleanly all immature-looking sprigs which may tend to shade the blossom-bud and produce too much spray in the succeeding Summer. The great hinderance to continuous good crops of this fruit, at least in the South Island, are the late frosts. Four or five degrees will suffice to destroy the season's crop. It would pay well to protect these trees while the fruit is small with nets made of coarse woollen material thrown over the trees. With care these nets would last for several years, and could be used for protecting cherries from the birds. The following varieties can be recommended:—Moorpark, Kaisha, and Royal.

The Cherry will thrive in any deep sandy loam. They are propagated by budding or grafting on wild cherry stocks (that is plants grown from the stone), after the same manner as pears and apples. Cherries require very little pruning. No shortening back is necessary. Pruning resolves itself into thinning away cross and crowded branches. Plant out in May, June, or August. The following varieties may be relied on:—May Duke, Amberheart, Blackeagle, Blackheart, Bigarreau, and the Morrello for preserving. Almost all

kinds of birds are partial to this fruit, and as a precautionary measure the trees should be planted in parallel lines, ten or twelve feet apart. A light framework should be erected running along both sides and ends made in sections, and having battens across over the trees. Covering all with netting by this means heavy crops may be secured. The frame work and netting may be stored in a dry place after use from year to year. Cherries and plums are subject to the attacks of leech, *Selandria Cerasi*, which devours the substance of the leaves, leaving nothing but the skeleton. If allowed to denude the trees of their leaves the fruit-producing power of the trees will be greatly diminished. Two ozs. of helebore dissolved in two gallons of water and applied with a syringe will completely rid the trees of the pest. It must not, however, be applied when the fruit is ripening.

Blackberries.—Great improvements have been made of late years in this useful fruit. They grow in any soil, but they prefer a moist, shady situation. They may be planted against any back fence or outhouse, some of them, such as the Lawton, may be grown in rows like the raspberry, and pruned in the same manner. The Italian is a late variety, ripening towards the Autumn; the fruit is not quite so large as the Lawton, but the flavour is much finer: it is not, however, so profuse a cropper. There are other varieties equally good.

The Currant.—The red and white will thrive in any light, rich soil, and may be produced from seed, but the more general mode of propagation is by cuttings. Select strong shoots of last season's growth, from six to twelve inches long, cutting off a few inches of the top, then remove all the eyes except three or four at the top, plant in rows one foot apart each way, this may be done at the same time as pruning. The young plants will be ready for planting out the second year. The heart of the bush must be kept well opened by pinching out or rubbing off all the young shoots which have a tendency to grow inwards. The leaders, that is the main branches, must have each season's growth cut back at least one-half its length, the object being

to encourage side spurs, which should be cut back to within half-an-inch of the base. These are the spurs which bear the fruit. A well-formed tree should have ten or a dozen main stems. Suckers must be removed as soon as they appear above ground. Another system of training currant and gooseberry bushes is by tying the main stems down to a hoop which has been fastened to stakes stuck in the ground; the hoop (wood or iron) being fastened with copper wire. The centre of the bush is kept clear of all spray or superfluous wood, the spurs or side branches which grow from the main stems are pinched back in Summer, or cut back to within a couple of eyes in Winter. This system of training entails some extra trouble without, in our opinion, producing commensurate results. Unfortunately the currant borer (*Aegeria tipuliformis*) has become a great pest, so much so that this fruit has been almost abandoned in some gardens. The only remedy we can suggest is to watch for the moths, and, when seen settling on the bushes, to syringe with kerosene emulsion. All affected branches should be cut out and burned. The best varieties are the Red and White Dutch. There are several new varieties possessing great excellence, and these may be had at any general nursery.

Black Currant.—This currant delights in a rich, moist soil, and will thrive in shady situations. Unlike the red and white currant, the black variety requires very little pruning, this operation being simply confined to thinning out superfluous shoots and cutting out the old exhausted branches, and those obviously affected by the boxer. When the bushes begin to grow too large and inclined to straggle, the best plan will be to take out each alternate bush and plant a young one, rooting out the others as soon as the young stock begins to bear, which will be in a couple of seasons. The principal crop of fruit is borne on the annual shoots rather than on the spurs; means must therefore be taken to excite and sustain a regular sprinkling of such wood all over the tree, and in this case there is not the same necessity for keeping the middle of the bush open as in the red and white currant and gooseberry. Black Naples and Lee's Prolific are good varieties.

The Fig.—Propagated by seeds, layers, and cuttings, by suckers, and by grafting. Almost any moderately-rich soil, provided it is not too dry, will answer for fig trees. Figs cannot be successfully grown against walls or fences unless attention is paid to disbudding. *Stopping.*—Fig trees which bear an abundance of short-jointed wood, will require attention in the way of stopping, which should be performed in February or early in March. This will induce the fruit for the ensuing year to commence forming, so as to receive a decisive character. Figs thrive best as standards, bearing abundant crops, especially in the North Island. In the South they do not bear so profusely; good crops are, however, secured in warm, well-sheltered, sunny localities. They require very little attention as to pruning beyond thinning out the weakly suckers, which sometimes abound; nothing more is required. Plant in rows fifteen feet apart and twelve feet tree from tree. The North Island is generally better suited for the fig as a standard tree than Canterbury or Otago. The best varieties are Black Bourjassotte, Brown Turkey and varieties, Brunswick, and Castle Kennedy.

The Gooseberry may be propagated as directed for the currant. Plant in rows six feet apart and four feet in the rows. Pruning may commence as soon as the leaves begin to fall, and on till July—leave only such branches in the tree as contain good firm buds. The shoots which are left should be well ripened. Having selected such well-ripened wood to be left on the tree, all spindly and weak shoots should be removed. The wood to be removed should not be cut off close to the main branches, but sufficient should be left on to form “spurs,” say three-quarters of an inch long, all coarse thick shoots should be cut away close to the stem; suckers must also be removed close to the stem; if allowed to grow, they rob the better fruit-bearing branches of sap, and the whole bush suffers. To sum the matter up concisely, pruning a gooseberry bush properly consists in cutting away, as directed, at least two-thirds of the annual shoots, and leaving the remainder shortened to two-thirds of their length, and all pointing away from the centre of the tree, which should be open like

a shallow basin. The hoop system, as described in the culture of currants, answers admirably for gooseberries. A top-dressing of manure in the Autumn will ensure a good crop the following season, unless the soil is naturally rich, in which case the manure had better be dispensed with. Gooseberries will not thrive in soils with a cold subsoil. Cuttings may be made as directed for currants, but avoiding thick sucker shoots. The following will be found useful varieties:—Early Sulphur (yellow), Golden Purse, Iron-monger (red), Lancashire Hero, Warrington, and Champagne (red and yellow).

Medlars are grown from seeds, which should be sown as soon as the fruit is ripe. They take two years to come up. The better plan, however, is to procure from the nursery the three or four-year-old plants. A couple of trees will suffice for an ordinary-sized garden when the trees commence to bear fruit, which they will do three years after planting. Grass should be sown round the trees and kept cut, as this fruit should be allowed to fall and remain on the grass for a week or so till quite soft, or they may be gathered and stored in a dark and airy place on shelves, but not on top of each other.

Mulberries.—Any good garden soil will suit for growing mulberries. All the attention they require is to prevent the branches from crowding each other by judicious thinning out. The black mulberry (*Morus nigra*) produces the best fruit. Every garden should have a tree or two; they are a delicious fruit when quite ripe. The white mulberry (*Morus alba*) is the most useful for producing leaves for feeding silk-worms.

Nuts.—The best varieties are the Red and the White Filberts. Almost any light loamy soil will answer. Dig or trench the ground deeply. The main thing in the majority of soils is to guard against over-luxuriance. This has the tendency of producing only male flowers. *Planting.*—When planted in rows they should be set not nearer than ten or twelve feet apart. Like the walnut they may be planted as shelter trees to the orchard. The nut produces

both male and female blossoms on the same bush. The male blossoms may easily be known by their gay dangling appearance, and by the yellow dust they shed on being handled—this dust is the fertilizing pollen. The female blossoms, on the contrary, are so obscure that they have to be sought for. When in full blossom they are of a lively pink colour, and appear like little brushes at the tips of the side shoots produced by mature wood. The cultivation of nuts is by no means difficult ; indeed, they are more likely to be injured by over-cultivation than otherwise. They should, in all cases, be trained to a single stem ; for the production of suckers (shoots from the roots), or rather, the permitting them to remain is most injurious to their future success. Suckers will spring up, but they should be removed every year. The only pruning necessary will be an occasional thinning of the inner branches, so that light and air can circulate freely through those that are left. Nuts are propagated by seed, layers, or suckers.

The Peach.—Ten or fifteen years ago this delicious fruit was as easy and as certain of culture as the apple in New Zealand. Planted as standards they required little attention, save an occasional tying-up or supporting of the over-laden fruit-bearing branches. Almost in every garden in the colony, North and South, luxuriant trees were to be found. Since then things have changed, and a really healthy peach tree is rarely to be met with. Premature decay seems to have attacked old and young trees alike : so much so that many orchards which were once noted for the quantity and quality of their peaches have almost died out. Unfortunately no specific has as yet been discovered for the prevention of this apparently natural decadence or blight. Exhaustion of the soil is not the cause ; for we have seen trees planted in virgin soil and in the course of two or three years they shared the same fate as those of longer growth. Vigorous cutting back and top-dressing with half-inch bones and with lime has been suggested ; while some experienced gardeners think that a total change of stocks for grafting upon would have a beneficial effect. Almond stones have been imported with this view. Professor Kirk, in his report on fruit blights and diseases of fruit trees in New Zealand,

recommends the use of the mussel plum stock. He thinks that its adoption would once more allow of the profitable cultivation of the peach. *Planting.* — Peaches are very impatient of wet; they require a light rich loam. Plant almost on the surface, as directed for apples, and stake if necessary. Pruning has not been practised much in the past, but as the trees are now more difficult of growth it may be better to pay a little attention to it in the future. The principal points to observe will be to thin out or remove superfluous shoots, in order to ensure sufficient light and a due circulation of air to the remainder.

The Nectarine.—This fruit requires exactly the same treatment as that recommended for the peach. It is, however, more susceptible to injury from exposure to hot parching winds.

Select List of Peaches and Nectarines.—*Peaches:* American Pound, Early Beatrice, Lady Palmerston, Late Admiral, Noblesse, Red Magdalene, Tunmer's Surprise, and Royal George. *Nectarines:* Red Roman, Stanwick, and Oldenburg.

The Plum.—A good sound loam is the soil best suited for plums. Plant in rows fifteen feet apart each way. They require little pruning as standards, except thinning out to give light and air, and to throw additional vigour to the bearing branches. Some varieties of the plum: such, for instance, as the Washington and Magnum Bonum, &c., if planted in a liberal soil, produce excessive growths of rampant wood, which is very detrimental to the well-being of the tree, and should not be allowed to grow. They should be removed during the growing season; if not done then they must be cut clean out in Winter. The gross shoots having been cut clean away, and the remainder thinned duly out, little remains to be done with old or bearing trees, unless they are producing too much gross wood, when they should be root-pruned as directed for apples and pears. The plum is subject to a mysterious blight which attacks old and young trees in rich or poor soil. It is called the Silver blight, for want of a better name, for the reason that the foliage of affected trees turn a silvery

colour. When this stage of the disease makes its appearance the tree is doomed. List of 12 select plums given in their order of ripening : — Early Mirabelli, middle of January ; Early Rivers, last of January ; Early Orleans, beginning of February ; Brahy's Greengage and Belle de Louvain, middle of February ; Jefferson and Pond's Seedling, end of February ; Late Black Orleans, Damson, and Coe's Golden Drop, early in March ; Reine Claude Bavy, middle of March ; Coe's Late Red, April. Japanese plums are recommended by some nurserymen for their large well flavoured fruit, our experience of them, however, is too limited to enable us to speak definitely.

Quince.—Every garden should have at least one or two quince trees. They thrive best in a loamy soil. Grown as standards, they occupy but little space, and require no pruning except an occasional thinning of over-crowded inner branches.

The Raspberry succeeds in any rich garden soil that is not too stiff, but prefers one that is very rich and rather moist, and sheltered from dry parching winds. It grows exceedingly well in sandy, alluvial ground, also in peat and soils that are mixed with peat ; but those that are heavy and compact, becoming hard in dry weather, do not suit it. In all cases abundance of decomposed manure should be applied when the ground is trenched before planting, and afterwards every Autumn as a top dressing, to be forked in in the following Spring. Raspberries are cultivated by suckers or by seeds, the usual mode being by suckers. Select young canes, with plenty of fibrous roots. Plant three in each clump, six inches apart, in rows four feet apart, and three feet clump from clump. Another plan, which commends itself for its neatness, is to plant single canes, two feet apart in rows, along a trellis composed of three wires ; the canes to be tied to the wire. Before or after the young canes are planted they should be cut back to half their length.

Pruning.—It is good practice to go over the plantation in December, and thin out with a sharp hoe the young suckers of the current year's growth, leaving five or six of

the strongest to each stool—this will save much work in the Winter pruning, and will materially improve the quality of the fruit. Should this thinning be omitted, as is usually the case in colonial gardens, all the weak shoots must be cut away as soon as the leaves begin to fall, and four or five of the strongest left, which must be shortened one-third of their length, leaving the canes from four to five feet long, according to growth. The wood which has borne fruit this year must also be cut away. Tie the canes in bunches of four or five. Plantations may be made any time in April, May, and August. If properly attended to in the matter of thinning, pruning, and manuring, a plantation will last for ten or a dozen years. The following are good varieties :—Red and Yellow Antwerp, Kentish Fillbasket, and Carter's Prolific.

Strawberries.—No plant makes a more profitable return for good treatment and cultivation than the strawberry, although they will grow and fruit in almost any soil, except stiff clay or light shingle. To do them really well they require a good, deep loam, resting on a clayey subsoil, as the roots delight in a cool moist bottom; and when this can be secured for them, no amount of sunshine will harm them, but, on the contrary, they will be all the better for the exposure, especially as regards the quality and flavour of the fruit. When huddled together, with a mass of foliage overlapping, or grown under the shade of fruit bushes or trees, as is frequently the case, they never attain that degree of perfection they do on a nice, sunny border, or in an open situation in the vegetable quarters of the kitchen garden. Shade is fatal to flavour and the other good qualities for which the strawberries are prized: for without moderate sunlight the crude juices are not converted into saccharine matter, without which they are little better than so much pulp and water, insipid and flavourless. To grow strawberries to the greatest perfection the beds should be renewed every three years. For forming new beds, runners should be taken off the old plants in December, or early in January, and planted in nursery beds in a shady situation, until they form strong, well-rooted plants: this should be in March or April. They should then be carefully lifted

with a trowel (taking care to saturate the bed with water the previous evening), and planted in their permanent quarters. This is a far better system than trusting to runners rooting in the rows. Some gardeners spread some rich, loose compost between the rows, in which the runners root freely in April; they are taken up with a trowel or spade and planted out at once. We, however, recommend the plan above mentioned. Before planting, the trenched ground should be tramped as firm as possible, otherwise the young plants will run too much to leaf. This is an important point in successful strawberry culture, and should not be neglected. Plant in rows two feet apart, and eighteen inches plant from plant in the rows, press the soil firmly round each plant, and give a good soaking of water, which must be continued a couple of times a week in the event of continued dry weather. A plantation made in this way will bear a moderate crop the following season.

The plants must be cleared of all runners as soon as they appear. This will concentrate the energies of the plant in developing strong, fruity crowns for the following season. Another system in strawberry culture is to allow the runners to grow, but to prevent them from rooting, by simply passing a ditch hoe along the rows under the runners and lifting them up once a week. This plan has much to recommend it if carried out properly, unless constant attention be paid to cutting the runners, two or three will grow for every one which has been cut, and the energies of the plant will be more heavily taxed. It is a common practice in the Old Country to spread clean drawn straw along the rows of strawberries, under the leaves, just before fruiting commences. Grass mowings from the lawn would answer equally well. This serves the double purpose of keeping the fruit perfectly clean and of keeping the soil shaded from the sun. Strawberries are very impatient of drought and will not produce freely without plenty of moisture, especially when the fruit is forming—afterwards much moisture is detrimental to the flavour of the fruit. Watering in this country is not often necessary; but, when required, it should consist of a thorough soaking or irrigation if possible. In May, the beds should be cleared of all

stray runners and withered leaves; but on no account should green leaves be removed as their function is to mature the crowns for next year's crop, unless when the plants have been badly attacked with the strawberry leaf blight (*Sphærella fragariæ*). In which case the whole of the leaves should be removed and burned, and the bed dressed with Bourdeau Mixture.

The spade should never be used among strawberries, as the roots lie close to the surface, and, if destroyed, the healthy vigour of the plant will be impaired. A light forking is all that is necessary, top dressing with decomposed manure.

The following are good varieties:—Black Prince (early), Keen's Seedling, La Marguerite, Rifleman, Sir Joseph Paxton, Trollope's Victoria. In New York State there is a strawberry called the "Wilson" which is very highly spoken of.

The Vine can be successfully grown in any light porous soil. The most suitable, however, being a calcareous loam on a dry subsoil. Whatever be the character of the surface soil, the substratum (or subsoil) must be free from stagnant water. Unless these conditions are observed it will be useless to try to grow vines successfully. If the ground is naturally deep and dry very little will be required beyond deep trenching and the application of well-rotted manure. One of the most important improvers or correctors of soil is lime rubbish. A great deal of trouble is sometimes gone to in preparing vine borders, such as excavating the soil for three feet deep, paving the bottom of the trench with lime rubbish, old bones, and fresh soil. This is not now considered necessary, provided the soil is naturally good, when the treatment above referred to will suffice. The requisite nourishment can be supplied by liberal top-dressing each season, which should be applied in May or June. One of the main features in vine culture should be to encourage a vigorous surface root action. This can only be done by a generous treatment of the surface soil of the border. Writing on this subject Mr. Thomson (an authority on vine culture) says:—

The fact that the roots of vines require to be as carefully cultivated as their stems is in numerous instances not systematically recognised nor acted upon. What is considered an orthodox border is made, and young vines planted, and while every necessary detail connected with the welfare of the stems is attended to with care, that upon which success mainly depends—namely, the culture of their roots—is not attended to with the regularity and care that is necessary to keep them where they ought to be—near the surface of the border.

The first step in leading the roots in their downward course is in mixing into the border a quantity of ordinary manure from the farm or stables. Naturally, the roots have the instinct, if the term may be applied, of going where they get most to feed upon; and planted in a border thus enriched, with the surface of it left uncovered, the roots go down in search of the more moist and consequently more available elements of nutrition at a distance from the exposed, drier surface. If at first no such manure is mixed in the soil, but instead of it bones and other appropriate manures, and immediately the vines are planted the farm-yard manure be placed on the surface as a mulching, and it be kept moist all through the season of the growth of the vines, the moisture and elements of nutrition in the surface dressing will attract the roots. It is not necessary nor desirable—should the first Summer be dry and hot—that more water should be applied than will keep the surface of the border moist by artificial waterings. The bottom will take care of itself, and if the upper portion is thus kept moist the roots will keep to it as sure as water runs downhill.

Every third year, some time late in Autumn or in Winter, when the vines are at rest, the mulching should be removed, and also the surface soil till the roots are reached, and immediately over them should be laid three or four inches of fresh loam and horse droppings in the proportion of four parts of the former to one part of the latter, and also a few barrowfuls of old mortar or charcoal, rather finely pounded, then over the whole throw as much rough stable litter as will keep the frost out. After the vines have begun growing in Spring remove the dry litter; then, or some time before

there is any chance of drought affecting the surface of the border, carefully lay on three or four inches of good farm-yard manure, and keep it moist. This process, if attended to, will keep the roots at the surface in the greatest health and activity. This is termed "root cultivation;" and if neglected the roots go down in search of moisture and nourishment, because they cannot get such at the surface, and the fruit is not so fine.

As we are addressing ourselves to amateurs it may be necessary to explain the technical terms in common use amongst practical men, the principal ones have the merit of being peculiarly expressive.

Disbudding signifies the removal of every opening bud, at the period of leafing, which is not needed for the present year's crop, or for filling up some space on the wall or trellis which would otherwise remain bare.

Thinning out.—This process consists of going over the vines again about the period they commence blossoming, and then making a final selection of the shoots to be allowed to remain. This is an operation too often neglected, and ends in the vine speedily becoming a confused mass of shoots.

Stopping.—This is pinching off the ends of those shoots which are to remain, and is generally performed at one joint beyond the one bearing the bunch. The best time for stopping will be about a week or so after the young bunch is well developed. At this early stage, the house should be kept moist by constantly wetting the floors and walls. It should be borne in mind that leaf should not be permitted to overlap leaf, and, above all, that no growing spray, whether lateral or terminal, should be allowed to shade the principal leaves. As the berries advance in size, thinning will be necessary: of course, where vines are grown on a large scale out of doors, for wine purposes, thinning will be out of the question, but against fences and in houses thinning must be attended to if fine, large, well-ripened berries are to be obtained.

Thinning.—When the grapes are well set the bunches should be looked over and thinned, removing one-third of the young berries, reserving always the most promising ones.

The quantity of bunches to be left on each vine must depend upon its size and age. The bunches should be handled as little as possible. Immediately after thinning the bunches the vine should have a good syringing (it must, however, here be stated that many experienced vine growers object to the use of the syringe, asserting that it should never be used after the vines have burst into leaf). Where artificial heat is used, it should now be increased to 80° during the day, and from 65° to 70° at night. This will be in September.

Pruning.—There are commonly three distinct methods of pruning practised—First, spur-pruning; second, long-rod pruning; third, ordinary pruning. Pruning should commence as soon as the leaves are all off, on no account deferred till Spring on account of the rapid rising of the sap, when the loss of sap would be great, thereby impairing the vigour of the plant by what is called bleeding. Pruning on the spur system consists in carrying up one leading shoot to the back of the house, establishing thereon what are termed spurs, at regular distances. About one to every foot is sufficient. These spurs are first developed as side-shoots, and in order to ensure their full development, they are produced during about three seasons. A good cane nearly the length of the roof, and about three-quarters of an inch diameter, may be pruned to one-third the rafter length the first year, another third the second year, and the remainder the third year. By this plan supposing a rafter 15 feet long, there will be about five large bunches the first year, ten the second, and fifteen or more the third year; and this will be found to tax the powers of the vine rather severely. By this mode every side shoot will be strongly developed, and consequently a selection may be made. The subsequent pruning simply consists in cutting each of these back annually to what has been termed the “spawn eye” that is to say, the last eye at the base of the young side-shoot, although some leave another eye.

Ordinary pruning is such as is commonly practised on outdoor vines trained against a house or fence, where the leading shoots are carried almost at random, and at first chiefly with a view to get the house or fence covered. Here

the pruner selects according to the character of the wood, little heeding its situation ; reserving the short-jointed and strong, and cutting away the weak. The shoots reserved are shortened back with reference to the space they have to occupy, say from three to six or eight eyes, as the case may be.

In all pruning it is an axiom to cut an inch or so above the eye or bud.

The following varieties are the best for the following purposes :—*For Early Grapes*—Black Hamburg, Black Fontignan, Madresfield Court (also Black) ; (white) Royal Muscadine, Buckland's Sweetwater, Foster's White Seedling. *Middle Season Grapes* (Black).—Black Hamburg, Madresfield Court. (White).—Buckland's Sweetwater, Muscat of Alexandria. *Late Grapes*.—(Black)—Black Alicante, Lady Downes, Gros Guillaume. (White).—Muscat of Alexandria, Golden Queen, Calabrian Raisin. The Black Hamburg and Muscat of Alexandria are the two best for general culture.

Propagation.—Vines may be propagated either from seed, eyes, cuttings, or by grafting. Propagation by seed is resorted to for the purpose of producing new varieties. The seed should be sown in August in heat, and transplanted into four-inch pots, increasing the size as required. The great element of vine-culture is to secure a continuous vigorous growth. Propagation by eyes is accomplished in the following manner :—Shoots for eyes must be obtained from well-ripened wood, selecting short-jointed lateral shoots, which should be taken when the vines are pruned in May or June. They should be labelled and heeled in soil till required in Spring. The eyes are prepared for planting by cutting them out, inserting the knife half-an-inch above the bud and cutting them out the same distance below ; or by simply cutting the shoot across, an inch above, and as much below the eye. The young roots will proceed from the wood *below* the eye. These are planted round the sides of a five-inch pot, three or four in each pot. Or the eyes may be inserted in a piece of turf about six inches square, having a hole scooped out large enough to contain the eye, along with a little mould. The vines are set close together on a bench in a warm vinery, and kept moist. This is a

favourite plan with many vine growers in England. Vines grow freely from cuttings, which should be selected at pruning time, choosing only well-ripened and short-jointed wood. The cuttings may be planted in pots, boxes, or out-of-doors. Each cutting should have two eyes over ground and one or two under the surface.

Planting.—The following method is considered a suitable one for most cases, presuming that the border has been prepared as directed. The vines should be planted three feet apart, allowing one rod to each vine. Plants one year old should be used, and the canes should be cut down to within two or three feet; this length of cane will be required to reach the bottom wire to which the cane is tied after it is planted. Care must be taken in planting not to bury the cane. The roots should be evenly spread on the border prepared for them, and covered with four or six inches of soil. Before planting, the canes will have to be pushed through the hole in the wall and tied to the wire inside. Vines thrive best when planted outside the house. The best time for planting will be from the beginning of August up to the first week in September, according to locality. The plants must be watered if the soil and weather be dry at the time of planting. When the planting has been completed the border should be covered with ten or twelve inches of litter. Vines grown under glass, without artificial heat, take about eight months to ripen their fruit. As the warm weather advances air must be given freely, and a moist atmosphere must be maintained by syringing and watering the floors. It is a good plan to give a little night ventilation during the months of October and November.

Rules as to Temperature.—During the night, beginning with a newly-started vinery, no harm will result if the temperature fall to 35° every night till the buds break; such a low temperature is preferable to a high one by means of hot-water pipes or flues. After the bud breaks, and from that period onward till the branches come into flower, a night temperature of from 45° to 50° will be sufficient in cold weather. During the flowering period the minimum should be 50° at sunrise, and after flowering and onward

till the grapes are ripe, it may range at from 60° to 70° (by fire heat, if necessary), according to the weather.

Day Temperature.—From the time the vinery is started till the buds break, much should be made of the sunlight, aided by fire heat. The heat should be got up early in the day: on dull days the maximum should be 60° , and on sunny days 70° to 75° . After the buds have broken, and from then till the vines come into flower, the maximum by sun should be 80° , and in dull weather from 65° to 70° , according to the temperature out-of-doors. When the berries are all set, it should be raised to 85° or 90° on fine and 75° on cold and dull days, and a lower temperature should not be given till the fruit is ripe. Space will not permit in this treatise of going more fully into the culture and management of the vine, which would require a volume of itself. We can, however, with confidence recommend to our readers a little work on the "Grape Vine: its Propagation and Culture," by John Simpson, from which we have obtained some of the above information.

The insects and diseases injurious to the vine are the vine-louse (*Phylloxera vastatrix*); mealy bug, red spider and thrip; mildew shanking, rust, warty leaves, and scorching of the berries. For the prevention of which, see chapter on "Injurious insects," &c., &c.

Walnut.—There are several varieties of this favourite nut. They require a deep loamy and fertile soil. They are propagated by seeds, grafting, and budding; by seed is however the most general method. Select the finest and best nuts; when thoroughly ripe bury in sand till Spring. Sow in rows two feet apart, covering the nuts with two inches of soil. The young trees should be transplanted every second year till permanently planted out. Plant seventy feet apart, in an open, airy situation. The only pruning they require is to remove straggly branches, so as to preserve the symmetry of the tree. Walnuts will commence to bear in this colony when six or seven years old, increasing with age. Few fruit trees will be found more profitable than the walnut. As yet they seem to have resisted the attacks of parasites. The only drawback we are aware of to

the successful culture of the walnut is the late frosts which occasionally destroy the chances of a crop for the season. This refers more particularly to the South Island. By planting the late varieties this may to some extent be avoided. For pickling, the fruit should be pulled while it can be easily pierced by a needle. Walnut orchards have been known to yield £150 per acre for little more than thirty trees. The price, however, varies greatly.

GRAFTING, IN-ARCHING AND BUDDING.

Grafting is one of the most simple, interesting, and yet the most important operation in the orchard, as by its means a worthless tree may be converted into a valuable one. The operation to be successful must be performed in Spring, when the sap begins to circulate freely (September and October). The art of grafting is of very ancient origin: it may be described as the application of a portion of the shoot or root of one tree or plant to the stem, shoot, branch, or root of another, so that the two shall coalesce (or join) and form but one plant. The shoot which is to form the summit of the new individual is called the Scion; the stem to which it is affixed is called the Stock; and the operation, when effected, the Graft. As the graft is merely an extension of the parent plant from which the scion came, and not, properly speaking, a new individual; so it is found to be the best method of propagating approved varieties of fruit trees without any danger of altering the quality of the fruit. Scions for grafting should be selected in July or August, before the trees are pruned, and heeled in in a shady place till required. In selecting these make choice only of those varieties which have been proved by experience to be well adapted to the locality. There are many varieties both of apples and pears which do admirably in one locality but are comparatively worthless in others. This is particularly the case in New Zealand owing to the range of latitude, and great variety of soils. (Where there has been no previous planting of course this precaution cannot be adopted.) The principal points to attend to in the process

of grafting are, first—whatever be the plan—to use a sharp knife, make the joints fit close, tie them firmly, but not too tight; let the barks of the scion and stock always be close together to admit of the inflow of sap on one side at least, whatever be the state of the other, for on that depends everything; cover the graft, when tied, with grafting wax, formed of resin and beeswax, in equal parts, and tempered with tallow, a small portion of which will reduce it so as to be laid on while warm with a brush, and cool sufficiently to coat over and join properly, as a body to resist the wet and the air. Some gardeners, however, prefer grafting clay. One particular point should always be attended to in grafting. The stock, should, at its highest point, have a bud, because nothing is more common than stocks dying down to the first joint, so that a graft would, in such case, be lost; because if the stock died back to the first eye, and the graft were above it, however well it may be done, it must fail; whereas the eye being at the very top of the stock the sap flows to that point, nourishing the scion. The different methods of grafting are known as whip grafting, cleft grafting, saddle grafting, crown grafting, and shoulder grafting.

Whip Grafting, also called tongue grafting, is the most generally used when the stock and scion are about equal size. The head of the stock is pruned off at the desired height, and then a slip of bark and wood removed at the upper portion of the stock with a very clean cut, to fit exactly with a corresponding cut, which must be made in the scion. A very small amount of wood must be cut away, and the surface made quite smooth; care being taken to keep the cuts perfectly clean, this applies to all modes of grafting. The scion must now be prepared; this should have, at least, three or four buds. A sloping cut must now be made in the scion; this cut must correspond with that in the stock. The two are then fitted together, care being taken that the bark of the scion is exactly adapted to the bark of the stock; for unless the bark of one side of the scion, at least, meets exactly with the bark of the stock failure is sure to be the result. When the scion and stock differ in point of size, of course only one side can touch.

These remarks apply equally to all kinds of grafting. The two are then bound firmly, but not too tightly, together with matting. The bandage is carefully covered with well-tempered clay, or grafting wax (which may be had from any seedsman), in order to exclude air from the wound : and the operation is finally left to nature, with the precaution, that any buds from the stock below the scion are removed as soon as they begin to sprout. In about six weeks or two months the young scion will have made growth, the union is then effected, and the ligature, as well as the clay or wax, may be removed ; care being still taken that the scion is not blown off the stock by high winds. To obviate this danger the grafts are sometimes staked on removal of the ligature.

Saddle Grafting is practised only where the stock is of moderate dimensions. The stock is cut into bridge-like form, and the scion slit up the middle, so adapted that it shall be seated across or ride upon the former ; but as in whip grafting the bark must at least on one side be neatly fitted to the bark on the other. This mode of grafting is particularly adapted to the propagation of rhododendrons.

Crown Grafting is practised on old trees, either for their total renewal, or upon large amputated branches, to renew by degrees. The scions are simply placed between the bark and the wood.

Side Grafting is, in general, performed on a stock, the head of which is not cut off, or on a branch without its being shortened. The great utility of this mode is the facility it offers of supplying branches to parts of trees where they may have become too thin, or making a branch in case of accidents. It is well adapted for espaliers, where a branch is sometimes wanted to fill a vacancy on the wall or trellis, and for the insertion of new kinds of fruits on established trees, in order to increase the collection. It is also usefully employed upon wall or espalier trees that have become naked of fruit buds near the centre, while they may have abundance towards the extremities. This kind of grafting is, however, not much resorted to.

Grafting Clay—How to make it.—Take some stiff adhesive clay, horse droppings, and fresh cow dung, equal parts, beat all up and work into a mass of the consistency of stiff putty. It is then fit for use. Grafting wax is coming into general use ; it is cleaner, and answers the purpose as well.

To Make Grafting Wax. — Take the following ingredients in the following proportions, and well pulled will not be affected by the weather :—

| | | | |
|----------------------|-----|-----|--------------------|
| Resin ... | ... | ... | 4 pounds |
| Beeswax | ... | ... | 1 pound |
| Pure raw linseed oil | ... | ... | $\frac{3}{4}$ pint |

These ingredients should all be melted together and poured into a bucket of cold water to stiffen, and then with greased hands pulled until white and tough. When required for use, if too hard, put a lump into warm water for a few minutes, and it can soon be worked with the hands. Some prefer to put the wax on in liquid form, but the other makes a much neater job, and is less prodigal of material.

Grafting Old Trees. — The following method of treating old trees is sometimes adopted in California :— When a tree is to be grafted over above the ground it should never have the whole top cut off at once. Select three or four of the centre limbs, or those that will form the best foundation for a new top, graft them, and leave all the rest the first year. The old top will bear some fruit, furnish shade for the trunk, and “catchem water,” as our invaluable Sam says, or in other words carry the sap. They will also form a hedge about the rapidly growing grafts, furnishing a support and preventing their being broken off by sudden gusts of wind. During June and July put in a few buds where the shape of the tree stands most in need, or where grafts have failed, and for this reason don’t rub all the suckers off.

Budding.—This interesting operation is the insertion of a bud of the current season into the bark of a tree which is intended to be budded. While all kinds of grafting must

be performed in the Spring, budding must not be commenced till the leaves have fully matured and the buds in the axles of the leaves are plump and ripe; this will be about Midsummer. Budding is more suitable for stone fruits—such as peaches, nectarines, and apricots—than grafting. Budding is most successfully performed when the young shoots, from which the buds are intended to be taken, have all but perfected their growth, and which will generally be from the beginning to the end of February. The mode of procedure is to make a transverse cut through the bark with the budding knife, and a longitudinal one about three inches long, cutting as deep as the bark; the cuts will make a figure like the letter T. The bud must then be prepared by inserting the knife a little above it, passing downwards and outwards till a piece of wood and bark, half an inch in length, is removed; then cut off the leaf, retaining the petiole; carefully remove the wood from the bark, retaining the core; although some advise that this is not necessary. (If there is a deep hollow behind the eye when the bit of wood has been removed, then the axis has been destroyed and the bud will be useless. Some gardeners say, however, that it is not necessary to remove this bit of waste wood.) In removing this bit of wood care must be taken to draw it upwards, if drawn downwards the axis of the bud will probably be destroyed. The bud is now ready for insertion. Having fixed upon the spot where the bud is to be inserted in the stock or tree, lift the bark of the stock, at the transverse cut with the bone end of the budding knife, and slip in the bud beneath the bark so lifted. Then make a clean cut across the top of the inserted bud, where it joins the upper edge of the bark of the stalk, the two barks thus united will allow the descending sap to flow into the bud. The bud must not be allowed to get dry before inserting it into its berth. Bind round with a piece of soft matting, taking care not to cover the eye of the bud. In the course of three weeks they should be seen to, when, if much swollen, the matting should be loosened. Insert the bud, if possible, on the shady side of the stem. Buds usually remain dormant till the following Spring; at this period the stock should be cut

three or four inches above the bud ; and the shoot, as it grows, should be loosely tied to the portion of the stock left on above the bud, in order to prevent its being injured by high winds. The second year this portion of the stock may be cut off close to the union of the bud and the parent stock.

In-arching.—This is, perhaps, the most ancient of all methods of grafting—indeed, it is supposed that the Ancients first learned the art from observing a case of natural grafting, caused by two branches rubbing together. In-arching consists of bringing the branch of one tree or shrub in contact with another ; both branches should be as nearly as possible the same size. A slice is cut off both branches, as nearly as possible the same size and shape, so that the bark of both scion and stock may exactly meet, they are then bound with matting. The scion and stock must be growing close together. In-arching should be performed in Spring. As soon as the union takes place, which will be in three or four months, the shoot may be separated from the mother plant. In-arching used to be practised in the propagation of rhododendrons and other hard-wooded plants. These plants are now, however, more frequently propagated by grafting.

“ Blight-proof ” Apple Stocks. — Mr. George Neilson, Curator of the Horticultural Society’s Gardens, Burnley, Melbourne, gives the following list of varieties of apple-trees which he has found to be unaffected with the American woolly aphis (*Schizoneura lanigera*) :—

| | |
|--------------------|------------------------|
| Northern Spy | Golden Queen |
| Winter Majetin | Fall Beauty |
| Irish Peach | Early Richmond |
| Teltoshy | Chastatee |
| Stubbart Codlin | Autumn Tart |
| Striped Beaufin | American Golden Pippin |
| Ruby Pearmain | Primate |
| New England Pigeon | Menagere |
| Magg’s Seedling | Yarra Bank |
| Lord Wolseley | William Anderson |

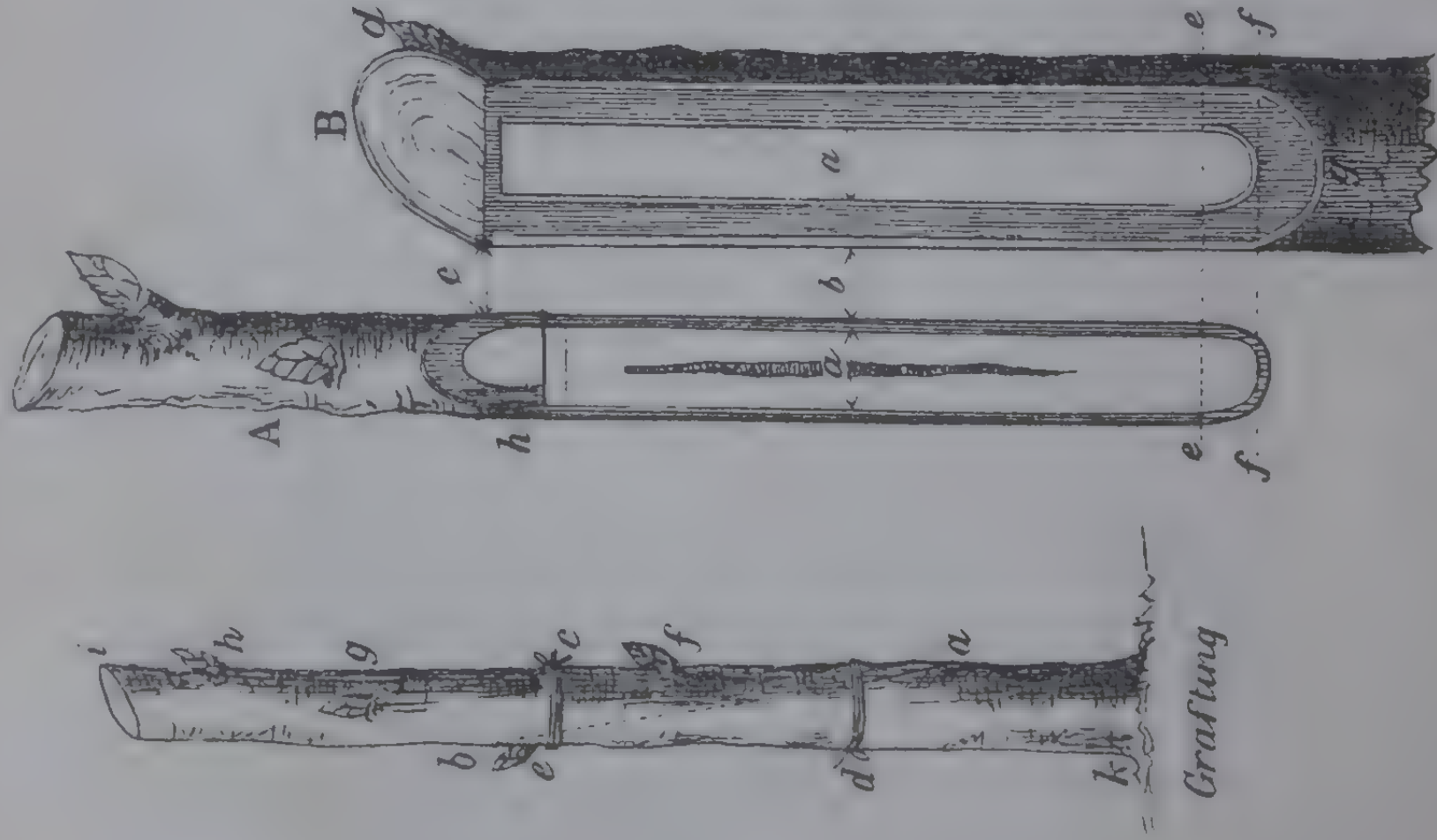
MANURES SUITABLE FOR THE ORCHARD.

Thoroughly well decomposed farm yard manure is the best of all dressings for the orchard, as it usually contains all the necessary constituents for plant food.

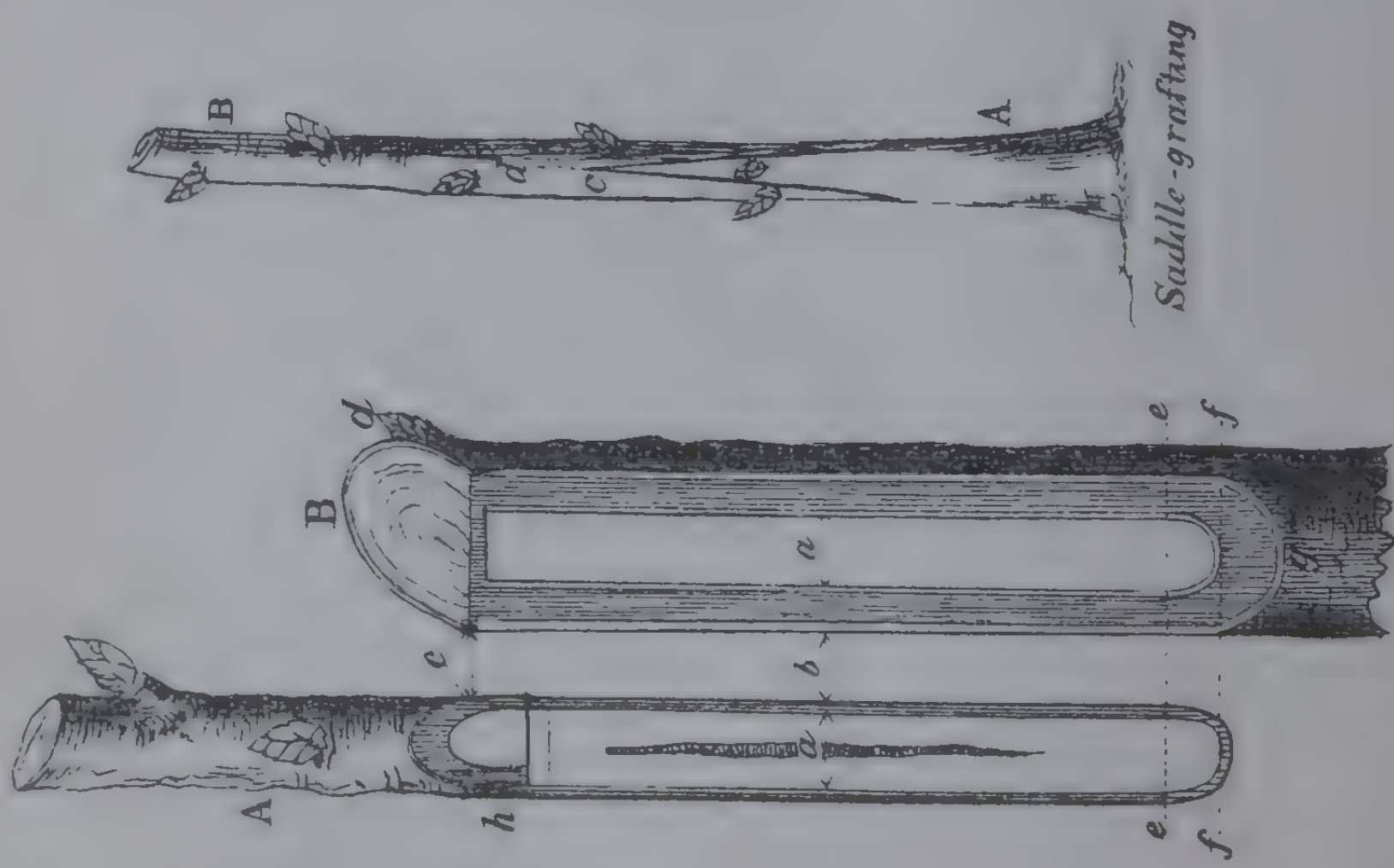
Bone Dust.—Failing a supply of farm-yard manure, the orchardist has then to consider two things: 1st, the character and composition of his soils; 2nd, the constituents most needed by his trees. Analysis shows that apples and pears require phosphates, and therefore bonedust or superphosphate are both suitable fertilisers for these trees. One cwt. of dried blood manure mixed with 5 cwt. of roughly ground bones forms an excellent dressing for an acre of orchard, each tree receiving its fair proportion, which can be easily determined by dividing the number of trees on the acre into 672 lbs. The bone-dust to be scattered on the surface so far as the branches extend, 18 inches from the stem. This is only necessary in young orchards. As soon as the trees begin to occupy the whole soil the dressing may be sown broadcast, and harrowed, hoed, or raked in.

Wood Ash—Which always contains more or less of potash, is a valuable manure in the orchard, especially for peaches, plums, vines, nectarines, cherries, etc. The prunings of trees, weeds, and the clippings of gorse hedges, if reduced to ashes by slow combustion, will supply a valuable compost heap.

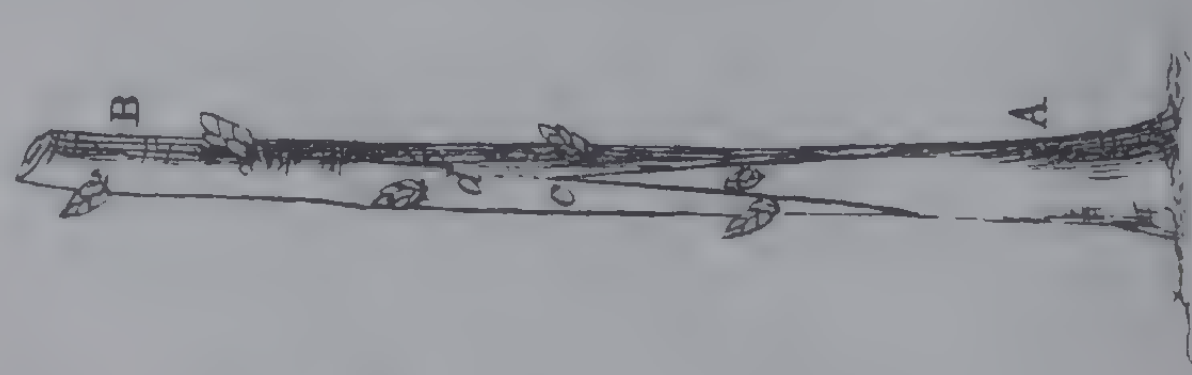
Lime in the Orchard.—Those orchards which have been planted on reclaimed swamp lands, well drained, will be greatly benefitted by a dressing of fresh lime from two to four tons per acre once in every four or five years. The action of lime on old soils full of vegetable matter and humus, which such soils usually abound in, is to liberate the unavailable plant food and to destroy injurious insects. Liebig attributes the beneficial effect of lime on clay soils principally to its action on the minerals in the soil, decomposing them and liberating the potash and soda.



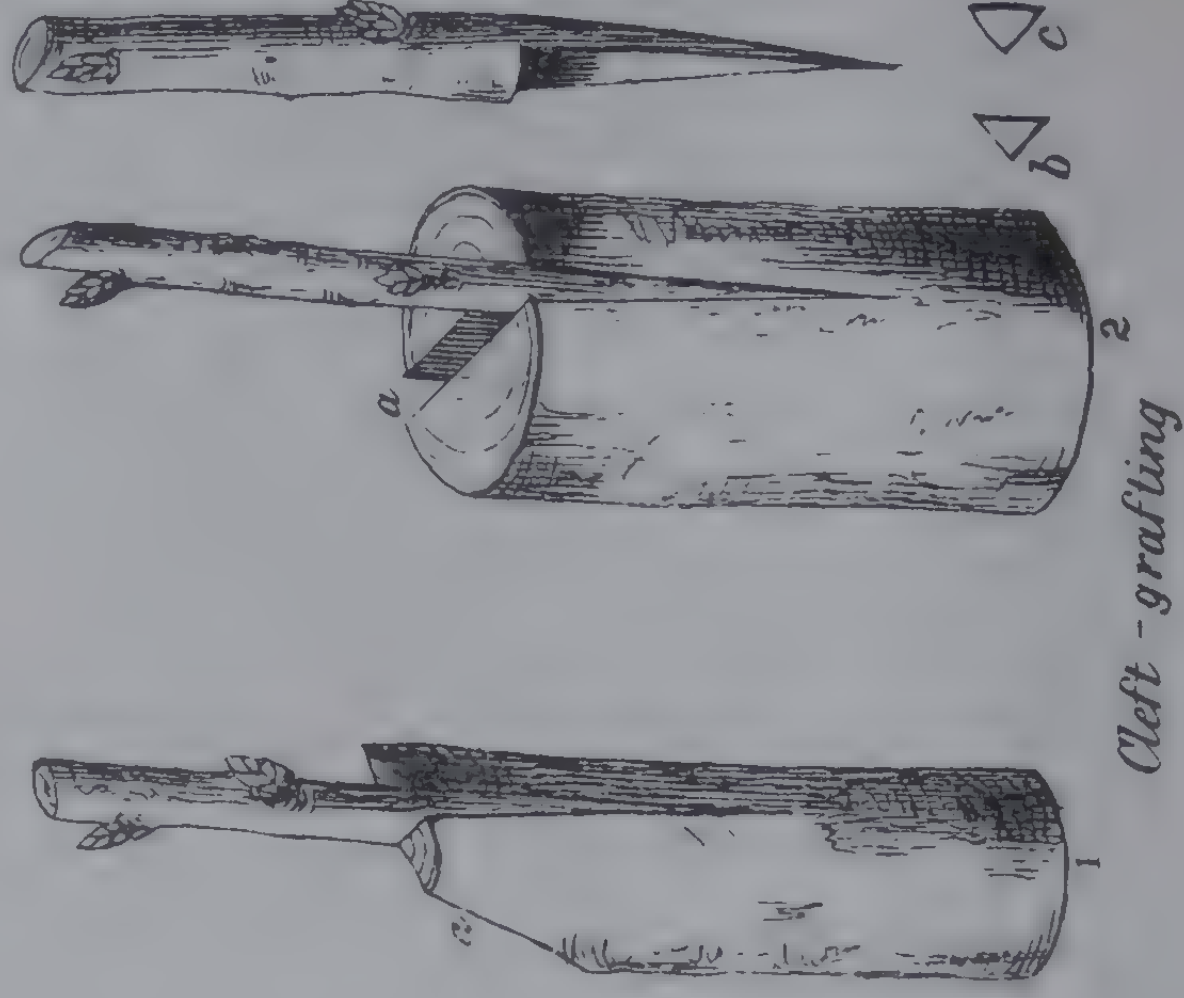
Grafting



Whip-grafting



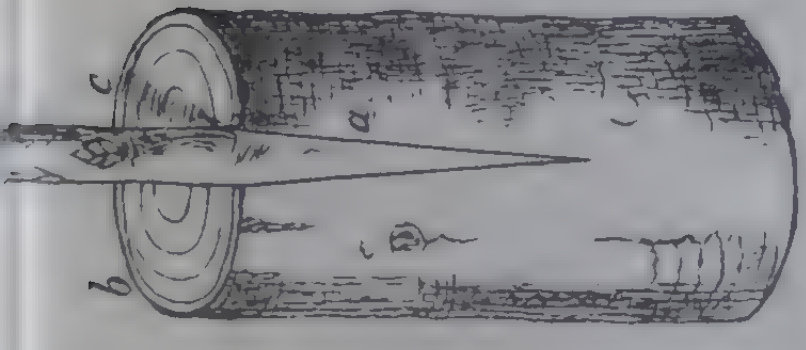
Saddle-grafting



Cleft-grafting



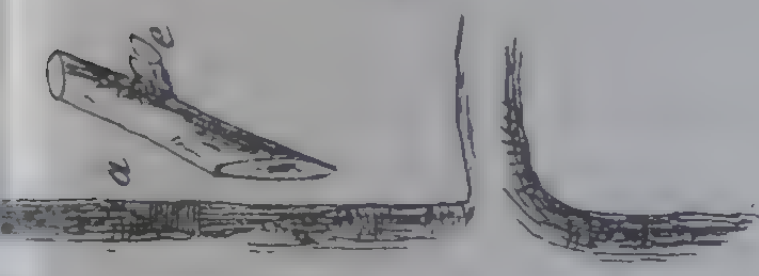
Triangular Notch-grafting



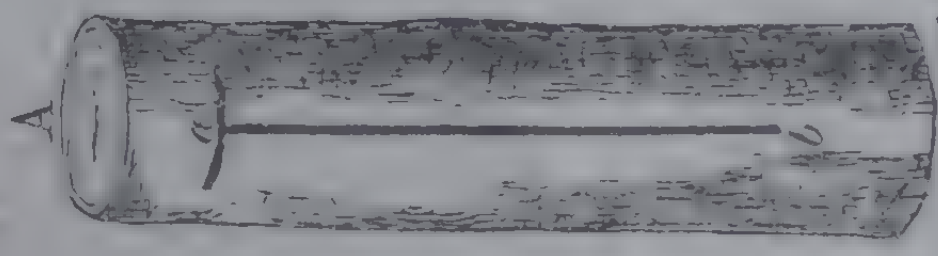
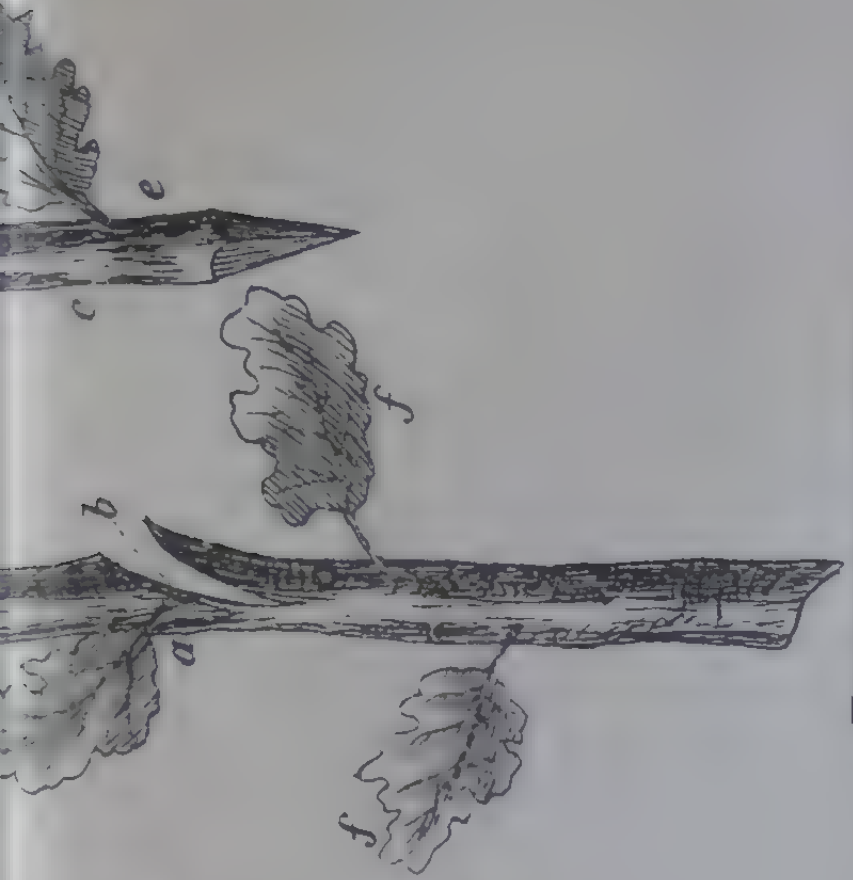
Crown or Rind Grafting



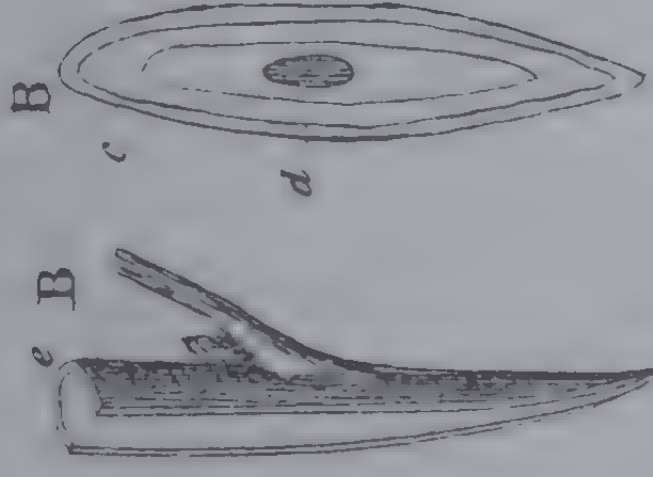
Side-grafting



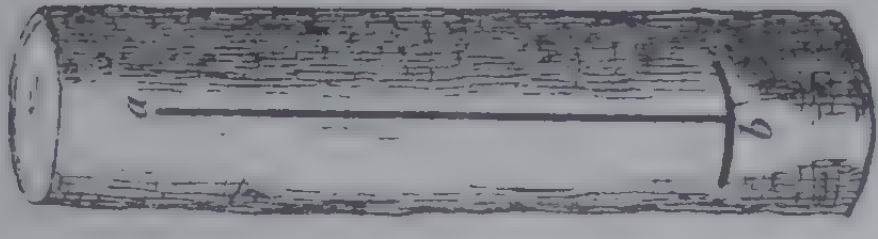
Herbaceous Grafting



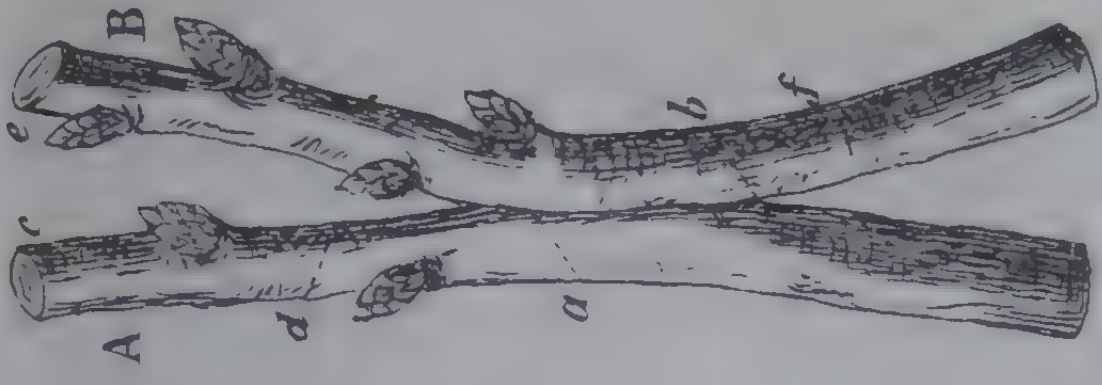
Shield budding



Inverted T-budding



Square Shield-budding



Inarching

Gas Lime may be used with advantage, but it should be allowed to remain in a heap exposed to the atmosphere for two or three months before application to the orchard, and frequently turned. The action of the atmosphere is to convert the hydrosulphate of lime into sulphate of lime or gypsum. In this state it may be used with considerable advantage, at the rate of 3 to 4 tons per acre. If applied fresh 1 ton will suffice.

Green Manure.—A writer in the *Agriculture Gazette* of New South Wales recommends the following method of treating young orchards. He says that green manures are very valuable as they bring up plant food from the subsoil; increase nitrogenous constituents in the surface soil; by decomposition produce carbonic acid, which disintegrates soil and thus converts insoluble mineral constituents into soluble; warm the land; and increase the power of retaining moisture and ammonia. The crops most suitable for ploughing in are vetches, oats, barley, buckwheat, rape, clover, mustard, and rye. Any of the above may be sown in April or May in 12 feet strips between the young trees, manured with a rich nitrogenous manure at once, mowed in November or December and put round the trees for mulching, and the stubble ploughed in immediately and harrowed down fine. This refers, of course, only to young orchards where the tree roots have not spread too far.

Burnt Clay.—There is, perhaps, no better way of improving a stiff clay soil than that of burning, but this can only be done where wood is plentiful.

GENERAL MANURES.

Generally speaking, the following manures may be applied to all orchards requiring assistance:—Soot is especially adapted for strong, clay soils, from twenty to forty bushels per acre; wood ashes, same quantity; bone-dust, five, to twenty cwt. per acre; stable manure, up to 20 tons per acre; lime, from one to three tons per acre; gas-lime, if applied fresh, one ton, if previously exposed, three to four tons.

EXPLANATION OF PLATE I.

Grafting.—*A* and *B* sloping cut commencing at *a* ; *c* and *d* ligatures ; *f*, *g* and *h* buds ; *k*, *d*, *e* stock ; *a*, *b*, *i* scion.

Whip Grafting.—*A* the scion, *B* the stock, *a a* the cut surface showing the wood, the points marked < should touch the inner bark of both stock and scion, while the points at *b* touch the outer barks. In preparing the graft, cut the top of the stock in a sloping direction from *c* towards *b*, terminating, if possible, above a bud, as at *d*. Cut the scion sloping from *c* to *f*, then enter the knife at *h*, and cut a thin tongue upwards to *c*. The scion is then ready for inserting on the stock. To prepare the stock enter the knife at *g* and cut a slice upwards to *c*, taking care to make the surface as nearly as possible the same size as that of the scion. Enter the knife very little below *c*, and cut a notch to receive the tongue of the scion ; insert the tongue of the scion (made at *h* by cutting half-an-inch upwards). See that the barks meet as directed ; then tie with matting, and surround with clay or grafting wax—the whole secret of successful grafting lies in the coincidence of the inner bark of the stock and scion.

Saddle Grafting should only be attempted when the stock and scion are about the same size. The stock *A* is cut like a wedge, terminating at *c* ; *B*, the scion is split up the centre, and placed over *A* the stock, taking care that the barks of both meet : tie and cover as directed above.

Cleft Grafting.—This mode of grafting derives its name from the mode in which it is performed, viz., a cleft is made in the stock with a chisel at *a*, keeping the cleft open till the scion is inserted. The section of the scion should be an oval *c*, and not a triangle *b* ; care being always taken to make the barks meet. Tie and cover with clay or wax. Cleft grafting is not recommended.

Triangular Notch Grafting is sometimes adopted instead of cleft grafting. The illustration will explain itself.

Crown or Rind Grafting.—This mode of grafting is preferable to cleft grafting, for the reason that the wood

of the stock is not interfered with. This form of grafting is adopted with old trees. The lower end of the scion is cut sloping, as in whip grafting. The head of the stock is cut over horizontally, and a slit *a* is made just through the inner bark. A piece of wood or bone, resembling the thinned end of the scion, is introduced at the top of the slit, and pushed gently down in order to raise the bark sufficiently to introduce the thinned end of the scion without being bruised. The edges of the bark are then brought close to the scion, and the whole is bound with matting and clay. Other scions may be inserted in like manner at *b* and *c*. Some American authorities recommend that when a tree is to be grafted over above the ground it should never have the whole top cut off at once. Select three or four of the centre limbs, or those that will form the best foundation for a new top, graft them, and leave all the rest the first year. The old top will bear some fruit, furnish shade for the trunk and carry the sap.

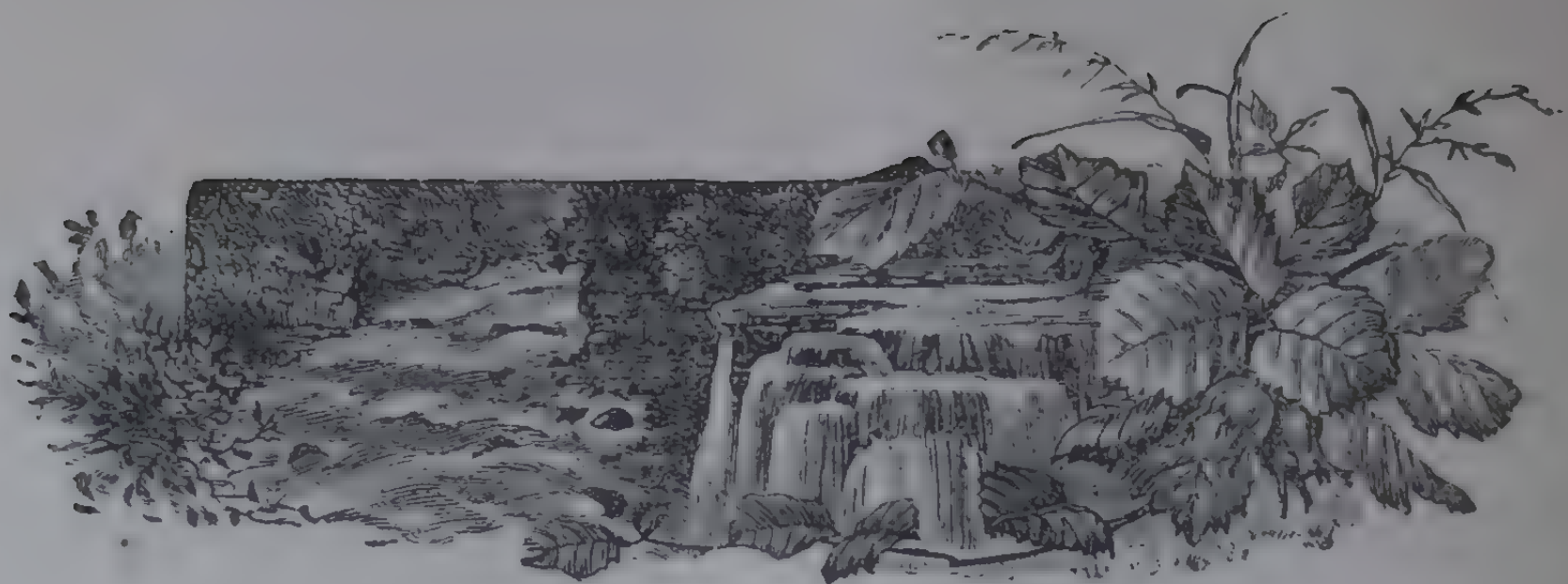
Side Grafting is a modification of whip grafting, and is performed in the same manner, except that the stem or branch, instead of being cut completely off, is notched to a greater or lesser depth, as at *b*. It is also useful for supplying a branch where required, as at *a*. In supplying a branch, as at *a*, the scion must be placed with a head pointing outwards, and the shoot proceeding from it trained in a horizontal direction towards *e*. When required to substitute another branch, a notch is made, as at *b*, and a slice is taken off between the notch and the stem, as at *c*. The graft is placed there. As the shoot grows it must be trained horizontally, and spurs, as at *d*, cut away. When the new branch has made a considerable growth, the original branch may be clean cut away at *b*.

Herbaceous Grafting. — As its name implies, is applied to herbaceous plants, when in full growth. Make an oblique incision, *b*, as close as possible to the base of the petiole of the leaf *a*, merely saving the bud in the axil. Into this incision the scion *c*, of the same diameter, and in the same state of growth as the stock, is fitted. The graft is then tied with coarse worsted. The leaf *a* is intended to

draw the sap towards that point ; whilst the leaf *e*, in the scion, partly absorbs the sap thus obtained. The fifth day after the operation, the centre eye in the axil of the leaf *a* is removed.

Shield Budding.—*A* the stock, *B B* the bud in different positions, *a* and *b* transverse and longitudinal incision, *c* the wood to be removed from bud ; it is not absolutely necessary to remove this wood. *D* the eye, *e* the bud ready for insertion.





FLOWER GARDEN



ORD BACON said that a garden affords the "purest of human enjoyments." Great men of every age have found their chief recreation in their gardens. Indeed, it may be said that the love of flowers is inherent in human nature. Wherever civilization has obtained a footing, the love for flowers has developed itself. Many of our most beautiful flowering plants are the result of scientific culture; while others, equally beautiful, are, as we find them in nature, incapable of further improvement. Verbenas, dahlias, geraniums, and a host of others, belong to the first class of plants. Heaths, and a numerous list of bulbs, including the magnificent *Lilium Auratum* (Japanese Lily), belong to the latter. The most successful growers of all kinds of plants, are those who know most of the natural habits of the plants they cultivate. Gardening in New Zealand is a comparatively easy matter when compared with the same operations in Britain, owing to the general mildness of our climate, and the absence of extremes. Any tolerably good soil will grow flowers, provided always that it is fairly well sheltered. In forming a flower garden the

ground should be trenched (as directed for vegetables.) Where the space is limited we prefer beds and gravel walks edged with box or some of the dwarf veronicas, etc. ; but, as these are robbers of the soil, tiles or brick are preferable. Green edgings are very nice, but they are troublesome to keep neat, and should therefore be avoided in small gardens ; the pattern of the garden must depend upon the shape and size the of the ground. Larger gardens may be laid down in grass, with beds interspersed, but grass requires incessant care, if neglected it soon becomes unsightly. Dandelions, Cape barley, and other abominations soon take possession, when the desired effect will be completely frustrated ; then comes the grass grub to complete the ruin (we shall have more to say of this pest when we come to treat of "Lawns").

Soils.—Any good dry soil (sandy loam is best) will grow the great majority of flowering plants to perfection. It must not be too rich, otherwise the plants will make too much growth, and too many leaves, and will continue to grow too long in the season before commencing to bloom, when this is the case it is a good plan to divest such plants as geraniums and pelargoniums of a third of their leaves. If in the cultivation of pot plants one thing is more necessary than another to be attended to, that thing is the proper preparation of soils and composts ; for, however great the care bestowed upon the potting and watering of a plant may be, if the soil is unsuitable, or not in a proper condition to supply the requirements of the plant, every other care is thrown away ; the more any garden soil is exposed to the ameliorating influence of winter rains and frosts, the more suitable it will be for the growth of flowering plants. This improvement arises principally from the expulsion of deleterious matters, the decomposition of vegetable substances, and the thorough disintegration of the mass of soil. The surface sods pared from old pasture land, if loosely stacked in some out-of-the-way place for twelve months, will become a valuable compost for potting plants. Such a pile should be found in every garden where much potting has to be done.

Hedge Plants.—The following is a list of shrubs suitable for this purpose :—*Cupressus macrocarpa*, Holly, English Beech ; (large gardens) *Pittosporum* (or Matapo), African Box Thorn (recommended by some. Our experience of it is not altogether favourable), Laurel (common), Osage orange, Evergreen Privet, New Zealand Broadleaf, *Berberis Darwinii*, *Retinospora plumosa*, etc. Of this list we prefer first, the common English Laurel, White Thorn, Evergreen Privet, and *Berberis Darwinii*. *Cupressus Macrocarpa*, once a favourite for hedges, is falling into disuse in consequence of its shortlivedness as a hedge plant. These should all be planted at such distances from the plants they are intended to shelter so as not to injure them by the encroachment of their roots. *In forming a flower garden* for the first time, the ground should be trenched—(as directed for vegetables). Where the space is limited, we prefer beds and gravel walks neatly lined with box, or some other plant. Tiles and bricks can also be used with advantage.

Shrubs suitable for Small Gardens.—A common mistake frequently made by amateur gardeners in laying out their plots of land, is the planting of trees and shrubs which are quite unsuited for the purpose intended, viz., ornamenting the beds and borders. It is no uncommon thing to see *Cupressus macrocarpa*, *Pinus insignis*, and *Wellingtonias*, etc., planted in gardens containing only a few square perches. This is an obvious mistake, as they soon outgrow everything else and have to be cut down ; whereas, if a little judgment were exercised when first planting, the collection would consist of a few dwarf-growing shrubs. These would remain for years “a thing of beauty,” especially if occasionally transplanted. The following can be recommended for small gardens : — *Retinospora obtusa*, *aurea*, *plumosa*, *aurea*, *argentea*, *filifera*, and *ericoides*. These are all Japanese plants and are dwarf, compact growers. *Berberis Darwinii* and *Japonica*, *Daphne indica* and *rubra*, *Deutzias*, *Kalmias*, *Rhododendrons*, *Ribes aureum* and *sanguineum*. List of hardy ornamental shrubs suitable for small gardens :—*Aloysia cilicidra*, 5 ft. (sweet scented verbenas) ; *Aralia sieboldii*, 4 ft. ; *Arbutus unedo*,

12 ft. (strawberry tree); *Arundo variegata*, 10 ft.; *Aucauba Japonica*, 6 ft. (Japan laurel); *Azalea pontica*, 4 ft.; *Chamœrops fortunei*, 10 ft. (Chinese fan palm); *Choisya ternata*, 6 ft.; *Cistus ladaniferus*, 3 ft. (gum cistus); *Clianthus puniceus*, 6 ft. (glory pea); *Hydrangea japonica*, 4 ft.; *Magnolia grandiflora*, 30 ft.; *Magnolia soulangeana*, 10 ft.; Rhododendrons; *Weigelia Abel Carriëre*, 4 ft. Numbers of others might be mentioned, including many beautiful native shrubs, such as *Veronicas*, &c., &c., collections of which can be seen at the public gardens, Christchurch, and elsewhere.

Laying down a Lawn.—When it is desired to form a lawn, the ground should be trenched as directed for the vegetable garden — any time during the Autumn. If the plot can be prepared in March a season may be gained by sowing the grass seed during that month; the surface must be thoroughly pulverised and trodden down firmly. The following is a good mixture, if procurable:—Crested dogtail, 2 lbs.; *Festuca tenuifolia*, 4 lbs.; *Festuca duriuscula*, 2 lbs.; *Lolium tenuifolia perenne*, 20 lbs.; 2 lbs. White clover; 8 lbs. *Trifolium minor*; *Poa memorialis* and *sempervirens*, 4 lbs. of each. This mixture will suffice for half an acre, and will form a very good lawn, and if kept cut close answers most soils. Special mixtures for laying down lawns may also be had from any seedsman. Some of our native poas and other grasses would answer admirably for lawn purposes. If the ground is of a retentive nature, sowing the seeds should be deferred till dry weather in August or September. March is, however, the best time in the year to sow grass seed for lawns. The above mixture will be found expensive, and may not always prove satisfactory. Devonshire green (a fine variety of perennial ryegrass) is more generally used, and if kept cut close will make an excellent lawn, and at a fraction of the cost of the mixture named. Commence to cut as soon as the machine will act. Some prefer the scythe for the first time of cutting. Roll previous to mowing; this will save the knives of the mower. Cut at least once a fortnight, or oftener if required, during the growing season.

The Grass Grub.—Every one who has had anything to do with grass lawns is familiar with this pest. The pest, when in the beetle state, may be heard and seen in the warm Summer evenings humming in great numbers over the grass preparatory to laying the seeds of future destruction. The best preventive we know of is the constant use of a heavy roller, and an occasional flooding of water when possible. The rolling should be the most frequent in the evenings, when the beetles first make their appearance. In the Autumn well-rotted manure or crushed bones should be applied if the soil is not naturally rich; if manure be objected to as unsightly, bone meal, soot, and salt may be substituted, and rolled in during moist weather: 7 lbs bones, 7 lbs. soot, and 1 lb. of common salt will suffice for every square perch (or $5\frac{1}{2}$ yards square), or 2 lbs. of superphosphate to the same area will be found beneficial, if applied in August.

Plants and Grasses best calculated to resist the Grub.—Yarrow (*Achillea Millefolium*). The grub will not touch this plant; it also resists drought in a remarkable degree. Its fine dark-green foliage, close set to the ground, suggests it as a plant which would prove admirably adapted for lawn purposes. It is, however, not well suited for tennis lawns, the foliage being too soft and easily bruised. *Poa pratensis*, commonly called Twitch, resists the grub better than any grass we know of, but it gets hard and matty, and is therefore not so desirable. White Dutch clover, in moist deep soils, if well attended to, forms a handsome green sward. It is also unsuited for tennis lawns.

Annuals.—If properly grown and attended to will well repay the trouble bestowed upon them. If allowed to grow in masses, unthinned and uncared for, they soon become untidy and unsightly. On the other hand, if they are sown at proper times, and thinned out as they grow, they will make robust flowering plants; and the flowering season may be prolonged by cutting off the seed-vessels as soon as they appear. Such annuals as *Godetia Lady Albemarle*, Lupins, *Phlox Drummondii*, &c., may be kept blooming for a couple of months longer than if allowed to ripen their seeds.

Mignonette may be kept flowering nearly all the year round by adopting this treatment.

Sowing.—Hardy annuals may be sown any time from the middle of August to the end of September, to be followed by tenderer kinds, which may be sown up to the end of November. A little rich compost, finely pulverised, should be prepared for covering the seeds with a small rake ; draw a portion of soil from the places where you intend to sow. Make as many of the hollows as you have varieties of annuals to sow ; if the weather is dry at the time, give a good soaking of water a few hours before sowing. Large seeds, such as Sweet peas, Lupins, *Convolvulus major*, &c., should be placed at the back of the border amongst the shrubs and herbaceous plants. Sow thinly, cover with a little fine soil, and press firmly with the back of the spade, rake or trowel. The quantity of covering must, in all cases, be regulated by the size of the seed. The following is a list of a few of the many annuals which can be recommended for general purposes :—*Bartonia aurea*, yellow, one foot high ; *Tagetes signata pumila*, bright orange, nine inches ; *Clarkia integripetala*, rose-coloured flowers ; *Dianthus* of varieties, one foot ; Larkspurs, in varieties, two feet ; *Linum grandiflorum rubrum*, scarlet, one foot ; Marigold, orange, African striped unique, and dwarf yellow or pigmy, one foot ; *Nemophila insignis*, blue, maculata, spotted, six inches ; *Portulaca* mixed ; these showy annuals (*Portulaca*), thrive best in light sandy soil ; scatter the seed thinly, and beat gently with the back of the spade. No other covering is necessary, this lovely little annual will reproduce itself each year where the soil is warm and dry, it delights to grow on gravel walks amongst the stones. *Zinnia elegans*, one foot ; Asters, double-quilled German, and double globe German, ten-week stock, one foot ; *Phlox Drummondii*, of sorts, nine inches ; *Lobelia pumila magnifica*, *Compacta*, and *Crystal Palace*, blue Asters, German Stocks, *Phlox Drummondii*, and *Lobelia* are usually sown in shallow boxes, and transplanted into the beds or borders ; this should be done in showery weather if possible. Where there is a greenhouse, the young plants should be transplanted into other boxes as soon as they are

large enough to handle, and kept under glass for a few weeks, when they should be placed in a cold frame to harden off, preparatory to planting out in the beds. Where there is no glass, amateurs had better purchase the plants all ready for planting: this will be in November. Mignonette, hybrid, spiral, and giant pyramid; Godetia, Lady Albemarle, Princess of Wales, and Duchess of Albany, all good, one foot; Sunflower, double and single, four to six feet; Nasturtium, King of Tom Thumbs, six inches; Perilla Nankinensis, foliage deep bronze, one foot (grown for effect). Abronia, umbellata, Acroclium (mixed), Amaranthus tricolour, Anagallis grandiflora (mixed), Canna, dark leaved (mixed), Celosia cristata, Clanthus Dampieri, Clintonia pulchella, Datura Wrightii Helichrysum, double (mixed), Leptosiphon carmineus, Linaria reticulata aurea, Matthiola bicornis (night scented stock), Martynia fragrans, Papaver umbrosum, vermilion with shining black spots on each petal, Rhodanthe maculata, Saponaria Calabrica, Schizanthus (fine mixed), Tropæolum Canariense, and Lobbianum. Should the ground be dry at the time of sowing, it will be well to give a good soaking of water a few hours before sowing. Cover lightly with fine soil; the depth of covering must be regulated by the size of the seed; the smaller the seed the less covering will be required. If watering should be necessary give a good soaking always after sunset. Occasional surface-sprinkling does more harm than good. These remarks apply to all plants. Packages of choice annuals ready made up may be had from any seedsman.

Biennials are plants which take two seasons to come to maturity, when they flower and die, such as Wallflowers, Brompton Stocks, etc. The best time for sowing will be in October, in moderately rich soil, earlier in the North Island. Sow thinly, and transplant into their positions for blooming in the beds or borders, when the plants are sufficiently strong, which should be in January or February; or they may be sown where they are to remain, and thinned out. Another plan is to transplant the young plants, as soon as they can be handled with ease, into a prepared bed, in rows six inches each way, where they may remain till

required for planting out the following Spring. The owners of small gardens had better purchase the plants as required from some florist.

The following is a list of hardy Biennials—Canterbury Bells, two and a half feet high ; Foxgloves, three to four feet, suitable for shady places ; Sweet Rocket, one foot ; Sweet William, one foot ; Wallflowers, two feet ; purple and scarlet Brompton Stocks ; the Scarlet Brompton and Queen Stocks, and the intermediate resemble the habit of the Brompton, etc , etc. Double Stocks may be perpetuated by making cuttings of well-ripened shoots which sometimes appear after they have flowered.

Perennials or (Herbaceous Plants).—Are plants some of which die down in Winter, the roots remaining, which spring up every year. These plants embrace by far the largest number of plants cultivated in our gardens. They may be propagated either by seeds, cuttings, or by division of the roots. The seed may be sown any time from 1st October till the end of November, and transplanted, when fit, as directed for biennials.

Propagation.—Such plants as the Phloxes, Penstamons, Campanulas, Delphiniums, &c., may be propagated in December by cuttings, if desired, planted in a cool, shady border ; or they may be lifted either after they have done blooming, and the leaves have withered, or early in Spring, which is the best time, and divided into as many plants as the tuft will permit of, taking care to have a good bundle of fibrous roots to each piece. Pæonies, Salvias, *Dielytra spectabilis*, herbaceous Spireas, and Lily of the Valley, and a host of other plants may be increased in this manner. Where perennials are extensively used for border decoration, they should be planted with a view to furnishing flowers the whole of the season. This may be done in the following manner : put in one that flowers in Spring, then one that flowers in Autumn, then one that flowers in Summer, then an Autumn one, next one of the Spring flowering, and then one of Summer flowering. Mix the colours in the same manner. By this means the general effect will be good, and no part of the border will be at any time without

bloom. The following are a few of the most suitable herbaceous plants for general cultivation :—

Tritoma Uvaria and varieties (commonly called Red-hot Poker plant) from three to four feet high, bright orange red, propagated by suckers, or division ; *Ageratum Imperial* dwarf blue, and *Mexicana*, one foot ; *Amaranthus melancholicus ruber*, a fine foliaged plant with blood-red leaves, one foot ; *Calceolarias*, golden yellow, one foot ; *Delphiniums*, of varieties, two feet ; *Fuchsias*, of varieties ; *Gazania splendens*, deep orange, a fine plant for planting in lines for effect, four inches ; *Mimulus*, of varieties, thrives best near water, or in moist soils ; *Pyrethrum*, golden and hybrid double, good for effect, six inches ; *Verbenas*, of varieties ; *Viola cornuta*, flowers mauve ; *Lutea*, yellow, golden gem, and true blue, all admirably adapted for beds, patches, or lines, four inches ; *Petunias*, of sorts ; *Geraniums*, golden tricolour, Zonale and plain-leaved ; *Pansies*, of sorts ; *Campanula pyramidalis*, the finest of all the bell-flowers, easily cultivated either from seeds, cuttings, or by offsets, three feet ; *Chrysanthemums*, Pompones, and large flowering, two to three feet ; *Pœonies* (including Tree and sweet scented *Pœonies*) all gorgeous flowers and free bloomers, of various colours, two feet ; *Salvia fulgens*, bright scarlet, *patens* deep blue, and *alba* white, height two to three feet ; *Lobelia cardinalis* and *fulgens*, deep scarlet, one foot.

Spring Blooming Perennials.—Double yellow, white, crimson, and lilac primulas, three inches ; *Polyanthus* primroses, of sorts ; *Iberis sempervirens* (Evergreen Candy-tuft) nine inches ; White *Hepatica* ; *alba* and *cærulea*, white and blue, three inches ; *Helleborus niger* (Christmas Rose), one foot, pink ; *Gentiana acaulis* (Dwarf Gentian), four inches, deep blue ; *Dodecatheon giganteum* (Giant American Cowslip) ; *Anemone Appenina* (Mountain Anemone), six inches, blue ; *Alyssum saxatile* (Rock Madwort), six inches, yellow ; Lily of the Valley ; *Phlox Nelsoni*, dwarf habit covered with dense masses of white flowers ; *Saxifraga oppositifolia* (opposite leaved Saxifrage), three inches, purple. These charming Spring flowers, although common in

England, are comparatively rare, as yet, in New Zealand, excepting the double primulas, which are now plentiful. Fancy primulas are to be had from several of the nurserymen who make specialities of these things.

The following is a list of a few choice varieties of Carnations, Picotees and Pinks :—*Carnations*—Avalanche, pure white ; Beauty, yellow ; Conquest, purple flake ; Favourite, scarlet ; Ka Ka, crimson ; Model, rose pink ; Mars, scarlet ; White Swan, white. *Picotees*—Clara Penson, white, edged with purple ; Harlequin, pencilled white ; Mrs. Twining, purple edged ; Obadiah, light scarlet edge ; Royal Visit, rose edged. *Pinks*—Alaster, Goliath, Suwarrow, Wafforn's Seedling Wonderful.

HARDY BULBS FOR SPRING & SUMMER BLOOMING.

When bulbs of any kind are left permanently in the ground their position should be indicated by a stout stick driven into the ground beside each clump, projecting two or three inches over the surface. Bedding plants may be planted close to them without injury to the bulbs, which will lie dormant during the summer months.

Procure some well known florist or bulb grower's descriptive catalogue and make your selection therefrom.

It will be impossible with our limited space to do more than name a few of each of the best of the numerous plants in this section. Hyacinths, the queen of spring flowers, rank first amongst hardy Spring bulbs—flowering from September till the end of October. Hyacinths delight in sandy loam, deeply trenched ; if manure is used it must be thoroughly rotted and well buried in the soil the previous Autumn ; old cow manure, or decayed vegetable mould is best. The bulbs may be left in the ground from year to year, but they will degenerate sooner than if taken up. It is good practice to lift the bulbs each year and clean them that is, take off all side shoots and rough scales, and plant

at once, putting a little sharp sand round the bulbs if available. If it is decided to lift the bulbs, do so as soon as the leaves have all withered away ; put into brown paper bags, label and put away in a dry, cool place till the time for planting comes round again. It is unnecessary to give a list, as new varieties are being brought out every season. They can, however, be purchased at from 4s. per dozen upwards. Plant four inches deep.

The Narcissus Tribes are now very numerous, and form a most attractive feature in the flower garden from early Spring to Summer. The Polyanthus, Narcissus, Poeticus florepleno, and their numerous varieties, are all adapted for planting in rows, patches, or beds. These, with such small bulbs as Crocuses, Snowdrops, and Jonquils, intended for planting in patches amongst shrubs, or the mixed flower borders, should have the places where they are to be grown enriched with well-rotted manure some time before planting. Mice sometimes make great havoc amongst the Crocuses. A little finely cut gorse spread over where they are planted will protect the roots. All the plants of this tribe may be planted in April or May, and should not be disturbed for three years, when they may be taken up, divided, and planted again. No garden should be without an assortment of these charming Spring flowers. The following bulbous plants are also admirably adapted for planting in beds or patches ; plant from three to four inches deep. A great deal of pleasure may be derived from growing the Narcissus in water, or in pots, for early blooming ; in glasses treat the bulbs same as that necessary for growing Hyacinths in glasses. It is not, however, necessary to keep the glass in a dark place. Change the water occasionally. Vases fitted with ornamental stones, and water with bulbs placed amongst the stones, will soon become objects of beauty. This method of growth is well adapted for amateurs with limited space.

Anemones, single and double, may be had in flower for months by planting at different seasons. Plant in May and again in August and September. Plant three inches deep.

Early Tulips.—These showy Spring flowers are now to be had in great variety, commencing with the double and single Van Thol's, which commence blooming in September, and with a selection the blooming season may be prolonged till November. The double yellow are remarkably showy, as are also the Parrot Tulips. Tulips are very effective when planted in masses or in beds, having regard to height and colour. Any tolerably good garden soil will answer for Tulips, so long as it is not too heavy in texture; they must not be treated with fresh manure. The soil must, however, be in good heart from previous manuring. Plant five or six inches apart, and three inches deep. Plant in May. Lift and separate once in three years. A few may be planted in pots at the same time (three or four in a pot) for early flowering in the greenhouse.

Scillas are perhaps the prettiest of all our dwarf Spring bulbs, Campanulata, English Bluebells. *Scilla Siberica* and *Præcox* are the earliest bloomers. *Scilla Bifolia*, *Peruviana* and *Alba* are also good. Plant in Autumn.

Dog's Tooth Violets.—The foliage of these curious little plants are more conspicuous than the flowers. Plant in Autumn.

Colchicums (Autumn flowering Crocus).—The following are good varieties:—The pencilled white single, and a double variety. Plant in Autumn.

Amaryllis, of varieties, are gorgeous plants, principally with brilliant crimson flowers; flower stalks one foot high; thriving well out of doors in good soil. The bulbs may be left in the ground for a couple of seasons. They are also admirably adapted for pot culture.

Valloto Purpurea, a lovely bulbous plant.

Ixias and Sparaxis may be planted in Autumn or Spring. They are now to be had in great variety. *Muscaria Botryoides* (Grape Hyacinth) and its varieties are pretty plants with white and blue flowers. Plant in Autumn and Spring.

Iris.—There are several beautiful bulbous varieties of Iris, which are worthy of a prominent place in the flower border. Plant in August or September.

Crocuses.—These well-known and beautiful Spring bulbs should be planted in May, in patches. There is a great variety of colours, all of which bloom profusely out of doors, but few, if any, of them excel the old yellow for effect when planted in masses. The bulbs may be lifted as soon as the foliage has died away after flowering. Put them in paper bags named, and stow away in a cool, dry place, or they may be allowed to remain in the ground from year to year, which is more preferable for amateur gardening. Transplant every third or fourth year. The following varieties should be in every garden:—White, purple, striped, yellow, blue, *purpurea grandiflora*.

Snowdrops (single and double). — These charming little gems may be planted in May, and remain in the ground where planted.

Cyclamens.—These lovely plants are more suitable for pot culture, although they can be grown successfully out of doors.

Anemone Nemorosa (Wood anemone)—Single and double. Unfortunately these pretty little plants are not to be had in any quantity in the colony. They raise their welcome flowerets early in Spring, and continue to bloom for a month or more. As their name indicates, they thrive best in a shaded situation. Plant in Autumn choice mixed varieties and St. Bridged strain. These are very beautiful in every shade of colour.

Hyacinthus Candicans (Cape Hyacinth). — A beautiful plant 3 to 4 feet high, bearing spikes of pure white flowers. Plant in Autumn or in early Spring.

Lilies.—These glorious flowers are best adapted for planting among shrubs or at the back of borders, or in the middle of large beds, the most of them being tall-growing. All the varieties of this family revel in deep, rich, moist

soil, which must, however, have plenty of drainage. Trench two feet deep, and incorporate with soil plenty of well-rotted manure mixed with peat mould if procurable. *Lilium giganteum* is a noble plant for effect where it can have plenty of space and shelter. It grows eight or ten feet high, flowers white, marked with crimson. This plant is more conspicuous for its stately appearance than for the beauty of its flowers. *Lilium auratum* and its varieties also flourish in the open garden if sheltered from high winds, perfuming the atmosphere for several yards in circumference: height from three to four feet, with gorgeous blooms. The following are also worthy of prominent positions,—as, indeed, are all the lilies—and should be found in every garden where the soil is suitable—rich moist loam. *Lilium japonicum*, height two to three feet, flowers large trumpet-shaped, colour white; *Lilium eximium*, height two feet, flowers trumpet-shaped and pure white; *Lilium candidum* (called the Christmas lily), height three to five feet, flowers pure white; *Lilium lancifolium album*, height three feet, flowers white. There are several varieties of this charming lily marked with red and spotted with rose and other colours. *Lilium excelsum*, height four to five feet, flowers deep buff; *Lilium Humbolti*, height four to five feet, flowers rich golden yellow spotted with crimson; *Lilium chalcedonicum*, height three to four feet, flowers brilliant scarlet; *Lilium superbum*, height four to six feet, flowers orange beautifully spotted with black; *Lilium tigrinum*, height three feet, flowers reddish orange spotted with black; the *flore pleno* (double tiger lily) is also a beautiful variety; *Lilium Thunbergianum*, and its varieties, are all good, height from one foot to eighteen inches, colours from pale yellow to rich orange-red and spotted with black; *Lilium umbellatum*, and varieties, are all good, height two to three feet, varying in colour from deep orange to orange-crimson, more or less spotted with black; *Lilium Croclum*, orange; *Lilium Hansonii*, bright golden yellow; *Lilium longiflorum*, pure white; *Lilium Cardalinum*, orange red. When lilies have finished blooming, and the stalks have withered, they should be removed, if necessary, and a stake placed in the ground to mark where the bulbs are. Lilies should not be lifted

oftener than once in two or three years, when it is necessary to reduce the size of the plant. When they have to be lifted they should be planted with as little delay as possible. Bulbs composed of fleshy scales soon perish if left long out of the soil. If the lily is to thrive it must have a deep, rich, moist soil with an admixture of peat and sand. Plant in Autumn or early Spring.

The Guernsey Lily is a beautiful Autumn flowering plant; the varieties are scarlet, pink, purple, and red. Plant in a mixture of peat, sand and good garden soil. Plant in September or October. The bulbs must not be kept long out of the ground.

Belladonna Lilies also flower in Autumn, and should be treated in the same manner as the last mentioned.

Tigridia, *Pavonia*, (day lily) scarlet and yellow; *Speciosa*, yellow spotted; *grandiflora alba*, and others are all gorgeous bloomers, and will thrive in any good garden soil. No garden should be without them. Transplant every two years.

Lily of the Valley.—This charming Spring flower is so well known that it requires no description. It delights in a moist, shady situation, where it will get either the morning or evening sun. Single and double, white and pink.

The Tuberoses.—The double-flowered American and Italian have deliciously fragrant flowers. The bulbs should be planted in August.

Schizostylis Coccinea. — Autumn *Ixia*; scarlet. Plant in May or August.

Freesias. — These beautiful and fragrant Spring flowering bulbs should be planted in pots as early in the Autumn as possible. Plant four bulbs in a six-inch pot, in light rich loam, plunge the pots in a cool place under a fence and cover over with ashes, where they may remain till the young plants appear above ground. They may then be removed to a cold frame or greenhouse where they are

to flower in August. A little liquid manure once a week while growing will be of great service to the young plants. When the blooming is over place the pots out of doors in a cool place to ripen off. The roots will keep best in their pots till required for repotting in January or February. We have found it a good plan to allow the bulbs to remain in the same pots for two seasons. The varieties are *Freesia refracta alba*, white ; *Leichtlinii*, yellow.

Fritillarias.—(Crown Imperials), are useful for contrast. Although stately in their habit of growth, they are not very showy, and therefore are not much sought after. Plant in Autumn or early Spring.

Violets.—To grow these universal favourites to the best advantage they should be taken up at least every second year, after they have finished blooming, any time in October, March or April. Break each tuft into separate plants, and plant either in beds or as edgings. Procure young plants from the sides of the old tufts, if possible. Violets delight in a rich sandy loam. The following are all good kinds :—*Single*.—Lee's Victoria Regina, Czar, purple and white. *Double*.—Maria Louise, Neapolitan, and Belle-de-Chatney, Compt-de-Zabra, pure, double white, and very large.

Hardy Climbing and Trailing Plants for covering verandahs, fences, arbours, or outhouses—Virginian Creeper *Clematis Jackmani*, *Miss Bateman indivisa*, and *Sieboldi* are good varieties. The Native *Clematis* is a most charming plant. *Honeysuckle*, *Flexuosa*, and *Sempervirens*, and the Japanese *Honeysuckle* (*Lonicera aurea reticulata*) are all good. *Passiflora Cœrulea*, *Solanum Jasminifolium*, *Bignonia*s with either red, crimson, yellow, blue or purple flowers. *Roses* of sorts, *Double-flowered Bramble*, *Banksian Rose*, *Lophospermum scandens*, rose-coloured flowers ; *Tropæolum Lobbianum*, crimson ; *Triomphe de Grand*, scarlet ; *Canariensie*, bright yellow. Sorts ; *Taxsonias* of *Wisteria frutescens*, dark blue and the white variety. The following plants may also be used as climbers, although not climbers by nature :—*Cratægus Pyracantha*, with clusters of bright

red berries during Autumn ; *Cotoneaster microphylla*, with bright red berries, admirably adapted for covering rocks or low walls ; *Pyrus Japonica*, scarlet crimson ; flowers early in Spring. These plants may be propagated by layers, cuttings or seed.

Primroses. — Double yellow, white, crimson and purple. These charming Spring plants are easy of culture ; they revel in moderately rich, moist soil, with plenty of sun. They commence to bloom in August in sheltered situations, and continue on till the end of October. When they have finished flowering they may be lifted and divided, and planted in some spare piece of land in a cool corner of the garden, and *Lobelias* and other Summer flowering plants put in their place. In March they can again be planted where it is desired to bloom them. They may be taken up, divided, and re-planted in March or April.

Polyanthus Primroses. — These beautiful flowers may be had in bloom from July till October by those who have a greenhouse or even a garden frame. When required for early blooming the old plants should be dug up and divided, leaving but one crown to each plant. Plant in four-inch pots, well drained, in compost composed of thoroughly well-rotted manure, fresh soil, a little peat, and a sprinkling of sand, well mixed ; place the pots in saucers in the frame ; give plenty of air during the day, and cover up as evening approaches. They must never be allowed to suffer for want of water ; but water must not be allowed to stagnate in the saucers. Remove to the greenhouse in June. Under this treatment they will present a delightful realization of the approaching Spring. The outdoor cultivation is similar to that given for Primroses, taking care that they do not suffer for want of moisture.

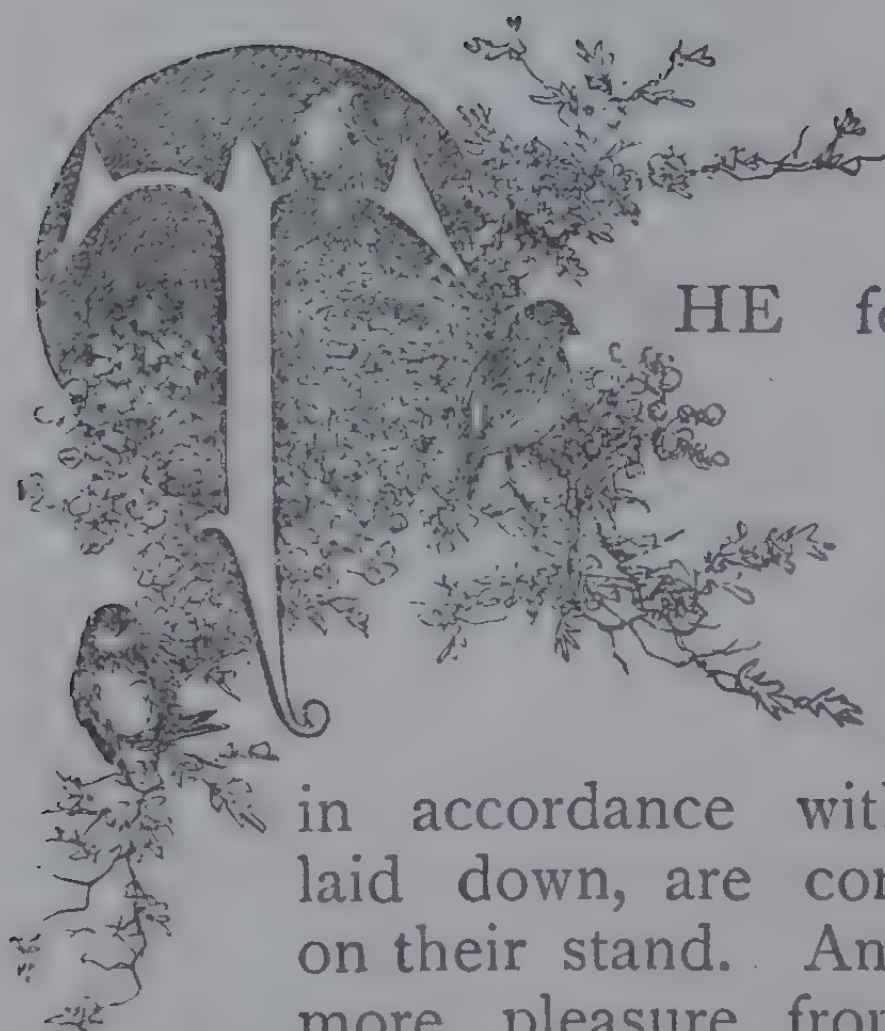
Gladioli. — These beautiful bulbous plants are admirably adapted for amateur gardeners, being easily managed. They are, however, better adapted for growing in borders amongst shrubs and herbaceous plants than for growing alone in beds. They may be planted any time from May till August. They revel in a deep rich, well-drained soil.

If planted in rows the bulbs should be placed two feet apart and three inches deep. It is a good plan to drive a stake alongside of each bulb. If planted in patches place three bulbs together \therefore in a triangle, three inches bulb from bulb, and a strong stake \perp driven firmly into the ground in the centre of the triangle and projecting three feet above ground. It is not necessary to lift the bulbs every year except they interfere with the Summer arrangement of the garden. Lift them every two years for the purpose of separating the bulbs, which increase very fast in good soil, doubling themselves every year. They may also be increased by preserving the young bulbs about the size of peas, which form about the sides and bottoms of the parent bulbs. These should be preserved by being mixed with light damp soil or sand all winter, and sown in Spring in rows a foot apart, and two inches between each bulb. In two years they make fine blooming plants : or they may be grown from seed. The following is a select list of Gladioli which will form a choice collection for a small garden:—Beatrice, pure white : Baroness B. Coutts, delicate lilac : Belle Gabrielle, white, shaded lilac : Diamant, white flanna with crimson ; Eugene Scribe, light rose blazed with crimson ; Lamarck, cherry colour, tinted with orange and red : La Fiancee, pure white, blotched : Lord Byron, bright scarlet : Madame Desportes, white and striped : Reine Victoria, white and carmine : Romulus, deep bright red ; Shakespeare, white, blotched ; Tamerlane, red, striped and blotched.





SPRING FLOWERING PLANTS.



THE following plants are sometimes grown as florists' flowers, which means, that a standard of perfection has been set up, by which they are judged. Only such plants as produce flowers in accordance with the hard and fast rules laid down, are considered worthy of a prize on their stand. Amateurs will, however, derive more pleasure from growing flowers in their natural forms, loose and airy, than from that pursued by the florist, where every petal must be a certain shape, texture, and marking. We prefer the natural to the unnatural. For illustration, there is no comparison to our mind between the symetrically stiff outline of the florist Dahlia, and that of the light and graceful cactus Dahlia. It is, however, necessary that the improvement of plants,

by high culture, like that of animals, be attended to, otherwise the general stock would deteriorate. The show characteristics of each plant described is gleaned from the best authorities, principally the "Garden Manual."

Anemone.—This showy plant is easily grown, but thrives best in a light and rich sandy loam. If requiring manure this should be dug deeply in, and should be quite rotten. If the roots come into contact with manure, they are apt to get the disease known as Mould which will destroy them. Anemones may be planted in tufts, rows, or in beds; the latter is by far the most effective plan. In dry situations the bulbs may be planted in April or May, when they will form roots before the dead season sets in, and will come away early in Spring. Should the Autumn be wet, it will be better to defer planting till dry weather in August. It is good practice to bed the bulbs in a little sand, taking care to place them right side up—the old fibrous roots will indicate the side which should be placed downwards. Draw drills across the bed, about two inches deep, and place the bulbs six inches one from the other, cover with two inches of nice fine soil, and firm it with the back of the rake or spade. Mice will sometimes attack the bulbs, in which case, a thin coating of finely chopped gorse spread evenly over the bed will protect them. If slugs abound, they will destroy the young foliage as it appears above ground; a light dusting of freshly slacked lime will prevent them from doing so. These flowers must be protected from high winds, otherwise a bed in perfect bloom may be destroyed in the course of a few hours. It is best to plant the double varieties separate from the single.

Propagation from Seed or the division of the roots.—The single and semi-double varieties produce seed freely. Seed saved from the best semi-double flowers will produce a fair proportion of double flowers. As the seed ripens irregularly, and is very light and downy, it must be carefully watched and secured, otherwise it will be blown away and lost. The seed may be sown as saved, or kept till August or September, when it should be sown in shallow pans or boxes, and

covered with a little fine sandy soil. It is a good plan to cover the pan or box with a sheet of glass. The soil should not be more than a few inches below the glass, and must be kept moderately damp. If allowed to become dry when the young plants are coming up, they will probably all perish.

We have had a splendid display of French Anemones grown in a box, three feet long, one foot wide, and eight inches deep. The seed was sown in February (as directed) and kept in a cool place out of doors till June, when the box was placed on the verandah. The variety of colours was charming. The seed can be had from most seedsmen. (Ask for French Anemones.) Anemones may be left undisturbed for two or three years; it is, however, desirable to take up the finer double varieties each year, when the beds are required for Summer planting. As soon as the foliage has quite withered away, lift the bulbs carefully and store them in brown paper bags in some dry place secure from mice. Label each bag as to its contents.

The characteristics of a Show Anemone are as follows:—The blossom should be from two-and-a-half to three inches in diameter, consisting of an outside row of stout, large, well-rounded petals, called the guard-leaves. These should spread out horizontally to the edges, which latter should turn upwards slightly, so as to present a saucer-like appearance. Within these guard-leaves, and at a little distance from the edges, there should be such a number of long, small petals, longest at the bottom, and gradually shortening to the centre, as to form a half ball. Self-coloured flowers should have the colour clear, bright, and distinct, whether it be blue, crimson or scarlet. If variegated, that is, the interior and exterior petals striped, the colours should be very distinct, for even cloudiness, or irregular broken stripes, are objectionable. The stem should be elastic, yet stout enough to bear the flower erect, and should be, at least, from eight to nine inches high.

Ranunculus.—The treatment of these plants resembles that of the Anemone, except that it requires a rather moister

soil, which should be deeply trenched, digging in an abundance of rotten manure from an old hotbed, or decomposed pig manure. The manure must not come into contact with the roots. The Turban Ranunculus is the most showy as well as the most hardy. Planting may commence in May, while some gardeners prefer planting in August—either season will answer if the ground has become tolerably dry. Plant as directed for Anemones, except that four inches between the roots will be sufficient.

The Ranunculus is very impatient of drought. As soon as the plants make their appearance above ground go over the bed and tread the soil gently but firmly between the rows and close up to each plant. When dry weather sets in the bed should be copiously watered in the evening, giving the bed a thorough soaking. Repeat the dose once a week should the weather continue dry. Stir the soil gently with a push hoe the morning after each watering, leaving the surface fine and loose. This will prevent evaporation. When the flowering season has passed and the leaves begin to wither the roots may be taken up, and when thoroughly dry place them in brown paper bags labelled and hung up in a dry cool place till required for planting. The varieties are the Persian, Turban, and French. When it is desired to prolong the blooming, the beds may be shaded with scrim stretched over wooden or iron hoops. The shading should only be used in rough, windy, or stormy weather.

Polyanthus.—*Characteristics of a show Polyanthus.*—“The *plant* should be healthy; the *foliage* large and abundant; the *stem* stout enough to bear the truss well up above the leaves, which should cover the pot, and rise up in the centre; from the centre of the leaves the stem should rise; the *truss* should consist of at least five flowers, and the footstalks of each flower be able to support each bloom level with the rest. Each flower, or *pip*, should be round and flat, neither inclined to cup nor reflex. The pips should be divided, near the outermost edge, into segments; each division, or *segment*, should be slightly indented or scalloped in the centre. Each flower should have a yellow centre, or *eye*; in the centre of that there should appear a

tube containing the anthers, but the pistil should not be seen. This yellow centre, including the tube, should be of the same width as the *ground* or *body colour*, which colour should either be a rich dark crimson or a bright red. Round this body colour the *margin*, or *lacing*, should appear of a uniform width surrounding each petal, and continuing down the centre of each to the yellow eye. The colour of this lacing, or margin, should be uniform, whether it is sulphur, lemon colour, or clear yellow." This is a description of what is known as a show Polyanthus, such as are grown for show purposes. Growing in beds it is not necessary to aim at the perfection required in a show plant. Quantity of bloom rather than quality is what is required in the flower border. The polyanthus will thrive in any good open soil, and in almost any aspect, so long as it gets a little sun each day. They are, however, impatient of drought, and should get a few good soakings of water—once a week during dry weather. These charming plants commence to bloom out of doors in September—earlier in warm and sheltered localities. They flower on till the end of October.

Propagation by Roots.—As soon as the plants have finished blooming (October) they may be lifted, and planted in rows in a nursery bed or cool border facing north or west. The old plants may now be divided, and allowed to remain in the nursery bed, as directed, till March; when those required for blooming in the greenhouse should be potted in a rich loam and watered frequently. Those wanted to furnish beds or borders may also be planted out where they are to bloom, or they may be allowed to remain in the nursery bed till August or September.

Propagation by Seed.—The seed should only be selected from the finest and strongest plants, selecting the largest seed pods. As soon as the seed pods turn brown they should be collected, cleaned, and made up in paper parcels, labelled, and kept in a dry place till Spring. September will be the best time for sowing the seed in pots or in shallow boxes filled with fine rich soil. Level the surface, press it with a trowel or a bit of glass or board, scatter the seed thinly, and cover with a quarter of an inch of fine

sifted sandy loam. As soon as the young seedling plants have two or three leaves, they may be pricked out into boxes or pots two inches apart. Water and shade for a few days afterwards. As soon as they have grown sufficiently large they may then be planted out in the seed bed and allowed to bloom there for the first season, when all the worthless ones may be discarded and the better ones allowed to remain for future treatment, as above described, by planting out in the borders or for potting.

Auricula.—Terms used in describing an Auricula.—*Thrum*, the stamens shown beyond the throat. *Pin-eyed*, the pistil showing beyond the throat. *Paste*, white circle next to the tube in the florist's flower. *Ground colour*, circle next to the paste, being the distinctive colour of the variety. *Edge*, outer circle or border. *Pip* is a single flower. *Truss*, a number of flowers on a common flower-stalk; it is desirable there should be not less than seven pips on each flower-stalk.

Characteristics of a good Flower.—The pip should consist of four circles, formed at equal distances round a given point. The first, the *tube*, round, of a yellow colour, the *thrum* rising a little above the eye, or paste. The *paste*, pure white, dense, and round. The *ground colour* should be dense and distinct, perfectly circular, next the paste, slightly feathered towards the edge. The *edge* should be distinct in colour, whole and circular, instead of starry in outline. The whole *pip* should be round, flat, and smooth at the edges. All the pips in a *truss* should show boldly, without over-lapping. The *stem* should be strong and the foliage healthy.

Propagation.—This may be done in a similar manner to that described for the Polyanthus, that is, by division, or by suckers from the parent plant, or by seed. Their after culture, whether for pot culture or in the open garden, is also the same. The Auricula delights in a light rich sandy soil. For potting, compost composed of well-rotted cow manure, or from an old hotbed, rotten sods from an old pasture, and a little sand. A shovel full of rich compost

may be put about each plant in the borders or beds in Autumn. This will help to shelter the crown of the plant, and the plant will be stronger and more vigorous for the following blooming season.

Antirrhinum (Snapdragon).—*The characteristics of a perfect Antirrhinum :—*

1. The plant should be dwarf; the flowers abundant; the mouth wide, and the more the inner surface turns up to hide the tube the better. 2. The tube should be clear and pure if white, and if any other colour it should be bright; and the mouth and all the inner surface should be of a different colour and texture, and form a contrast with the tube. 3. The petal should lap over at the indentations, so as not to show them; the texture of the tube should be like wax or enamel; the inside surface, which laps over, should be velvety. 4. When the flower is striped or spotted, the marking should be well defined in all its variations; the colour should be dense, whatever that colour may be. 5. The flowers should form spikes of six or seven blooms, close, but not in each other's way; and the footstalks should be strong and elastic, to keep them from hanging down close to the stem, which they will do if the footstalks are weak.

Propagation.—The Antirrhinum is propagated by seed and by cuttings. The seed should be sown in a box, or in a spare piece of ground, or in patches where it is to stand. Sown in March they will flower the following season, or they may be sown in October. There are few plants which vary so much when raised from seed. Half an ounce of seed although saved from an individual plant will produce a numerous variety of different coloured flowers—pounced, spotted, striped, and selfs, and from which the best may be selected, and the worthless ones thrown away.

If it is desired to have a long season of bloom, cut down the first flowering spikes before the seed is formed, then fresh flower-spikes will push forth from the base of each plant, and there will be a succession of bloom.

The finest flowers will always be produced on young plants ; therefore, whoever wishes to excel in blooms should renew his bed and plants annually.

When it is desired to perpetuate any particular plant the best way to do so will be by cuttings, taken from the tips of the branches, about three inches long. These will strike freely in sandy soil kept moderately moist, and in a cool, shady situation.

Tulips.—These gorgeous flowers are easy of culture. They require very similar treatment to that recommended for Hyacinths. The beds must be deeply dug and thoroughly pulverized. The best time to plant the bulbs is in April or May. A handful of sharp sand placed round each bulb will be beneficial, as they thrive best in an open soil from which water passes away quickly, and the bulbs will lift much cleaner in the following Autumn.

The Characteristics of a Show Tulip are as follows :—
1. The cup when fully expanded should form, as nearly as possible, half a hollow ball. The petals, six in number, must be broad at the ends, smooth at the edges, and the divisions where the petals meet scarcely showing an indentation. 2. The three inner petals should set close to the three outer ones, and the whole should be broad enough to allow of the fullest expansion without *quartering* (as it is called), that is, exhibiting any vacancy between the petals. 3. The petals should be thick, smooth, and stiff, and keep their form well. 4. The ground colour* should be clear and distinct, whether white or yellow. The least stain, even at the lower end of the petal, would render a Tulip comparatively valueless. 5. Whatever be the colours or marks upon a Tulip, all the petals should be marked alike, and be perfectly uniform. 6. The *feathered* flowers should have an even, close feathering all round, and whether the feathering be narrow or wide, light or heavy, it should reach far enough round the petals to form, when they are expanded, an unbroken edging all round. 7. If the flower have any marking besides the feathering at the edge, it

* *Ground colour* is that upon which the other colours are laid.

should be a beam, or bold mark down the centre, but not to reach the bottom, or near the bottom of the cup ; the mark or beam must be similar in all the six petals. 8. Flowers not feathered, and with a *flame* only, must have no marks on the edges of the flower. None of the colour must break through to the edge. The colour may be in any form not in blotches, so that it may be perfectly uniform in all the petals, and does not go too near the bottom. 9. The colour, whatever it be, must be dense and decided. Whether it be delicate and light, or bright, or dark, it must be distinct in its outline, and not shaded or flushed, or broken. 10. The height of a Tulip should be from eighteen to thirty-six inches ; the shortest is proper for the outside row in a bed, and the tallest for the highest row. 11. The purity of the white, and the brightness of the yellow ground colours should be permanent, that is to say, should continue until the petals actually fall.

Very few amateurs can spare the time necessary to grow Tulips up to the standard required to produce really good show flowers ; but every one who has a plot of garden can have a display of these showy flowers with very little trouble. In moderately dry soils the bulbs may be left in the ground for three years, when they will require to be lifted and separated. If, however, they must be taken up to make room for Summer plants, they should be carefully lifted and heeled into light soil for a time. When the foliage has decayed, the bulbs should be dried in the sun, and stored away in boxes or thick brown paper bags till required in Autumn for planting. If the ground is wet or cold, planting had better be deferred till August.

The Tulip bed should be open to the north, and well-sheltered from high winds. If hedges of Laurel or Cupressus Macrocarpa surround the garden, the bed must be sufficiently removed from them to allow of a free circulation of air and sunlight. The period of blooming may be prolonged by providing artificial shelter as recommended for the Ranunculus. The following is a list of single and double Tulips which can be recommended :— Tulip Clusiana, white, striped, red, black centre, etc. etc. ;

Gesneriana, brilliant scarlet; Crimean, early double and single Tulip; Parrot Tulip; Darwin Tulip, a new class, flowering later; Show Tulip (florists' varieties).

Pansies.—These universal favourites are rarely grown to any great perfection. At least in Canterbury it is not often that a stand of what would pass the critical eye of a florist is to be seen at any of our shows. The fancy varieties are in more general demand. They require less attention, producing a profusion of blooms, generally poor in texture it is true, and of all shapes and sizes, with flimsy petals. They are, however, more easily grown than the show varieties, and they produce a profusion of gay blooms.

The following are the characteristics of a Show Pansy as defined by the Editors of the "Journal of Horticulture." There are three classes of florist flowers:—1. Selfs, that is flowers all of one colour. 2. Having yellow orange, sulphur or straw-coloured ground with margins of maroon, crimson, chocolate, bronze, puce, and their intermediate tints. 3. Having a white ground with margins of purple, blue, mulberry, and their intermediate tints. The characteristics are:—1. Each bloom should be nearly perfectly circular, flat, and very smooth at the edge; every notch or unevenness being a blemish. 2. The petals should be thick, and of a rich velvety texture. 3. Whatever may be the colours, the principal, or ground colour of the three lower petals should be alike; whether it be white, yellow, straw-colour, plain, fringed, or blotched, there should not in these three petals be a shade difference in the principal colour: and the white, yellow or straw-colour should be pure. 4. Whatever may be the character of the marks or darker pencillings on the ground colour, they should be bright, dense, distinct, and retain their character, without running or flushing, that is, mixing with the ground colour. 5. The two upper petals should be perfectly uniform, whether dark or light, or fringed or blotched. The two petals immediately under them should be alike; and the lower petal, as before observed, must have the same ground, colour, and character as the two above it; and the pencilling or marking of the eye in the three lower petals must not break through to the

edges. 6. If flowers are equal in other respects, the larger, if not the coarser, is the better ; but no flower should be shown that is under one inch and a-half across. 7. Ragged or notched edges, crumpled petals, indentures on the petal, indistinct markings or pencillings, and flushed or run colours, are great blemishes ; but if a bloom has one ground colour to the lower petal and another colour to the side ones, or if it has two shades of ground colour at all, it is not a show flower. The yellow within the eye is not considered ground colour.

Soil.—The soil best adapted for growing Pansies is a rich, moist, sandy loam. In preparing a bed for Pansies it should be dug from eighteen inches to two feet deep incorporating with it a quantity of old hot-bed manure, which should be at least two years old. Old cow manure is also suitable for these plants. The proportion of such manure should be equal to one barrow load to say three of soil. Pansies thrive best in a moist and cool climate, hence it is that the farther south we go in New Zealand, the more easily are they grown. It is true that we can have a brilliant display of these favourite flowers during the Spring and early Summer months in the warmer localities ; but as soon as the hot drying winds set in they go off, and their beauty is gone for the season. In cooler localities they continue to bloom far into the Summer, and, indeed, into the Autumn.

Propagation by division and by cuttings.—Few plants, if any, are more easily propagated than the Pansy. As soon as the flowering season has passed, they throw up a mass of side shoots. The plants may be lifted in March and separated, every bit of which will grow if planted in a bed in drills nine inches apart, and four inches plant from plant. The bed should have been deeply dug, and enriched with decomposed manure, and should have a southern aspect. If not naturally moist it will require an occasional saturating with manure water. Cuttings made of the young growth strike freely in a moist situation. If made in March they will be ready for planting out in May in the beds or borders where they are to bloom. The large divided plants can be used for beds, and the young ones from the cuttings for

lines and edgings. Renewed in this way they will flower vigorously each Spring.

Propagation by Seed.—Pansies seed very freely. The seed may be sown as soon as collected, but it must be quite ripe. It is best, however, to sow it in boxes or pans in August or September. As soon as the plants are sufficiently large to handle they should be planted in a finely-prepared bed. Plant six inches apart where they may remain till they bloom. Select the best, and discard the rest. Pansies should be planted deep, taking care however not to cover the crowns.

Hyacinths.—Under the heading of hardy bulbous plants, general instructions are given as to the growing of this deservedly popular flower. The present remarks will, however, refer more to the cultivation of the Hyacinth for show purposes than for ordinary blooming. The following standard of excellence, as described by the authors already referred to, has reference only to the former:—

The chief characteristics of a show flower are—size and form of the flower spike. To be a fine specimen the spike ought to be at least six inches long, and two inches in diameter at the lower and broadest part, tapering gradually up to a single pip. But form or proportion is the greatest merit; and the handsomest proportions for the spikes are for its length to be twice the diameter of its lowest part, and for the whole spike to form a cone.

Size and Form of Pips.—The outline of each, looking at it in front, should be circular; and looking at it in profile, it should be semi-circular. In other words, each pip should be half a globe. To effect this the petals (if the flower is single) require to be strongly bent back, or reflexed, so as to throw forward the centre. In double flowers it is not needed for the outer petals to be much bent back, as the semi-globular form in them is partly attained by the inner petals being imbricated, or lapped over each other in tiers, (like the tiles on a roof.) The lower pips should be large—an inch and a quarter in diameter is a superior size; and

the pips of each circle should gradually diminish in diameter as they approach nearer to the summit. The petals should be thick, glossy surfaced, as if made of wax and rounded at the end. Sharp-pointed petals always injure the outline of the form of the spike. *The Footstalk*, or stem, of the spike should be straight, stout, and of a height sufficient to raise the lowest part of the spike just above the points of the leaves. The footstalk of each pip should be gradually shorter as it approaches nearer the top ; and each should spring from the stem at an angle just a little less than a right angle, so as to aid the pips in adapting themselves to a conical form, and yet to keep their broad faces, or discs, full before the eye.

Colour.—What we say on this point is applicable to competing flowers of every species, for in all it should be esteemed as entirely subordinate to form and size. The reason for this is sound ; for form and size, if no accident interferes, are superior just in proportion to the skilfulness of the cultivator. Colour, therefore, should have no further weight than to turn the scale in favour of the best coloured, provided that two specimens are equal in form and size. In the case of selfs—that is, flowers of one colour—the most uniform and brightest are best ; but in flowers of more than one tint the colouring is best where the colours are distinct, and not clouded into one another.

Fragrance.—When flowers, such as the Hyacinth is, are of a kind yielding a perfume, if the rivals are equal in other qualities, we should award the prize to the most fragrant. It is even a criterion of good cultivation.

The soil best suited for growing hyacinths has already been stated—plenty of old hot-bed manure, fresh loam, and sharp sand. To produce an effective bed of hyacinths alone, the bulbs should be planted not farther apart than nine inches. The crowns of the bulbs should be three to four inches, according to size, beneath the surface. It is a good plan to put a handful of sharp sand about each bulb, especially if the soil is inclined to be heavy. After the bed has been prepared for planting it must not be tramped upon.

A board may be used for standing upon, which can be shifted along as required. This precaution should not be neglected.

In planting a bed of Hyacinths it is a mistake to mix the colours. It is more effective to group the different colours together in circles, or in lines radiating from a clump of one colour in the centre.

During dry parching winds, which sometimes occur in October, the bed must be watered. The blooming season may be prolonged in the same manner as that indicated for the Ranunculus, viz, by shading.

Hyacinths in Glasses.—For window decoration there cannot be anything more effective than a few Hyacinths grown in hyacinth glasses. Fill with clean water up to the neck, place the bulb in the cup, but barely touching the water, then place the glasses in a dark room or press for a fortnight or three weeks, by which time the bulbs will have made roots. Place them in a window facing east or west for a week, when they may be moved to a window with a northern aspect, shading during mid-day. Probably before the roots reach the bottom of the glasses, they will become coated with a filmy substance. This must be removed in the following manner:—Draw the bulb out of the glass and wash the roots in a basin of water, drawing them gently through the hand; then carefully replace them, twisting them gently round and round till they reach the bottom of the glass, which should, in the meantime, have been thoroughly washed. Then fill with clean water, taking care not to submerge the bulb. This operation should be repeated if necessary. When the Hyacinths have finished blooming, draw the bulbs gently out, and plant them in a well-prepared piece of land, making a trench sufficiently deep to take the roots without injuring them. Bulbs once treated in this way are only fit for borders in the following season.

Carnation and Picotee.—These beautiful flowers can be successfully grown in almost any kind of soil so

long as it is free from stagnant water. They thrive best, however, in a light rich loam.

The difference between these flowers is that in the Carnation the colours in the petals run from the centre to the edge, and through the edge in flakes, or stripes of colour; whereas the colours in the Picotee are confined to the outer edge of the petals.

Show Carnations are divided into five classes, namely:—
1. Scarlet Bizarres, 2. Pink or Crimson Bizarres, 3. Scarlet Flakes, 4. Rose Flakes, 5. Purple Flakes.

Bizarre is a French word, meaning odd or irregular. The flowers in these classes have three colours, which are irregularly placed on each petal. Scarlet Bizarres have that colour predominating over the purple or crimson; but the Pink or Crimson Bizarres have more of these colours than the scarlet. Scarlet Flakes are simple white grounds with distinct stripes or ribbons of scarlet. Rose and Purple Flakes have these two colours upon a white ground. The properties of a show flower are as follows:—The petals must be stiff, free from notches, and slightly cupped; the ground should be pure white, without specks of colour; the stripes of colour should be clear and distinct, not running into one another, not confused, but dense, smooth at the edges of the stripes and well-defined. There are several other characteristics of a show flower, but these are the leading features.

Picotees are divided into seven classes:—1st, Red, heavy-edged; 2nd, Red, light-edged; 3rd, Rose, heavy-edged; 4th, Rose, light-edged; 5th, Purple, heavy-edged; 6th, Purple, light-edged; 7th, Yellow ground, without any distinction as to breadth of edge colour. Carnations and Picotees may be grown in beds or indiscriminately in the border, the latter is the more general. Show sorts are usually grown in beds.

Propagation.—Carnations and Picotees may be propagated by layers in the following manner:—Prepare some compost composed of fresh soil, old, well-decomposed manure, and a little sand; mix together, and pass through

a $\frac{1}{4}$ -inch mesh seive. Put a shovelful of this round the plant about to be operated upon. First clip off all the leaves of the lower branches, make a slit in each branch below a joint, half way through the stem, passing the knife upward for half an inch ; then fasten the branch or layer into the soil with a hooked peg or a strong hairpin, taking care not to separate the layer from the main stem, proceeding in like manner till half, at least, of the branches round the parent plant have been treated in like manner. It is usual to trim the tops of each layer. The operation will now be complete ; give a gentle watering with a moderately fine rose. Layering may be performed in January or February. The layers will be rooted in about two months, when they may be separated from the parent plant, and planted out where they are to remain, or into a nursery bed.

Propagation by Pippings, or Cuttings. This is not so certain a method as layering. Slips may be taken off the plant. Trim off the lower leaves, never drawing them downwards, as by doing so the stem will be stripped of the bark, which should never be done. Having trimmed the lower leaves, cut the shoot or branch just below a joint ; plant in rows six inches apart and three inches cutting from cutting ; press the soil firmly but gently, and finish off with a watering. The bed selected for the pippings, or cuttings, should be sheltered, and facing south. A large proportion of the cuttings will root, and be fit for planting out in Spring. Cuttings may be planted in pots and kept in a cool place. Where only a few plants are required it will be more convenient to use pots, taking care to have plenty of drainage, composed of broken pots, and over these some rough screenings or portions of old sods, broken up ; water well and shade from the sun for a few days.

Propagation by Seed.—Select seed pods from the best strains, those nearly double (double flowers do not produce seed). Keep the seed in a dry place till August or September, when it may be sown in pots, pans or shallow boxes. The seedlings will probably have grown large enough by November or December for transplanting into a nursery bed, where they may remain till they flower in the

following Spring. Select the best and discard the rest. The percentage of plants worth keeping will be small unless the seed has been saved from choice varieties. But for the pleasure which is derived from raising plants from seed, with the chance of producing something new, amateurs will find it more convenient to purchase a few plants ready for planting out.

Carnations and Picotees require renewing every third year, as they will then be getting too large and straggly. A simple plan of keeping the plants off the ground, especially the bloom, has already been described. It is by taking a piece of wire netting twelve inches deep, cut off a length say twenty-seven inches, make it into a hoop and fasten the ends by the loose bits of wire, making a circle. Place this hoop over the young plants, peg it to the ground by driving a couple of stakes through the meshes into the ground. The plants will grow and fill the hoop, and when in bloom they will look much more natural than when tied to a number of stakes. There is no trouble, all that is necessary is to direct the growth of the plants. When they are well grown the wire is not visible.

Thining the Buds.—When extra good blooms are desired it will be necessary to thin out all the weakly flower buds, leaving two or three only on each stem. This is, however, only necessary when flowers for show purposes are required. It must be remembered that the best, if not the most abundant blooms, will be had from young plants of last year's growth; two year old plants produce the best bloom where quantity not quality is required.

Pinks.—These beautiful flowers are quite equal to Carnations or Picotees. They resemble them much in habit of growth, except that the leaves are narrower and the bloom smaller. The characteristics of a Show Pink are as follows:—The flower must be fully double; so much so, that it should form the half of a ball, rising up to the centre, and should be perfectly circular in outline. Each *petal* should be stout, broad, and smooth at the edges. This smoothness is called *rose-edged*; that is, without any notches

or teeth. The lowest tier of petals should be the widest, reaching in diameter at least from two to two-and-a-half inches. The next row should be shorter, so much so as to show the lacing fully on the lower petals; and the next shorter again, and so on up to the centre, which should be well filled up without confusion. The *ground colour* should be pure white. The *lacing*, or circular stripe, should leave an edge of white outside of it, and another inside: this lacing of colour should be of the same width as the outside edging of white, and should be smooth and even at the edges; in fact, laid on as if it had been traced by a skilful hand with a fine camel-hair pencil. Then at the bottom of the petals, there should be another body of colour, the same as the lacing, to form a bold, rich eye.

All the instructions with reference to Carnations and Picotees are equally applicable to the Pink. They are propagated in the same manner, and young plants may be raised from last season's seed, sown in September, and treated as directed for Carnations. Pinks are very effective grown in beds. Let the bed be deeply dug and treated with well-rotted manure. The pipings (or cuttings) when well rooted may be planted in the beds in March, when, if the young plants are strong, they will establish themselves before the winter sets in. Plant them in rows one foot apart, and one foot in the rows; firm the soil about the stem, but be careful not to cover the crown. Pinks are very effective when planted in rows along a border. They may also be planted in the early Spring. Of those planted in the Autumn the bed will be the better of being carefully forked over, care being taken not to disturb the young plants. If the fork cannot be used, then a push-hoe will answer the purpose.

The Wire Worm is a deadly enemy to the Pink, Carnation, or Picotee. A sharp look-out for them should be kept when digging the bed. A few of these pests will destroy a bed of these flowers in a very short time. They destroy the roots, the plants turn sickly and yellow, and die, and the amateur wonders what can be the cause. The wire worm, as its name indicates, is not unlike a bit of bright yellow wire, about one inch long. (See chapter on pests.)

Dahlia.—This showy plant was once the principal favourite of the garden. It is still to be met with in most gardens, but not occupying the premier position as in the past, a position it is entitled to. It is better adapted for large gardens as the plants require plenty of room to bloom to perfection ; still every garden should have a few especially of the fancy varieties. To grow them to perfection the ground must be deeply dug and well dressed with manure. Dahlias are divided into four classes by show varieties :—Cactus, Bouquet, or Pompom, and Single Dahlias. The characteristics of a Show Dahlia are :—1. *Form*—Viewed in front the flower should be a perfect circle ; the petals broad at the ends, smooth at the edges, thick and stiff in substance, perfectly free from indenture or point, and should cup a little, but not enough to show the under surface. They should be in regular rows, each row forming a perfect circle, without any vacancy between them ; and all in the circle should be the same size, uniformly opened to the same shape, and not rubbed nor crumpled. 2. Looked at sideways, the flower should form two-thirds of a ball. The rows of petals should rise one above another in rows : every petal should cover the join of the two petals under it, which the florists call imbricating ; by this means the circular appearance is perfected throughout. 3. The *centre* should be perfect ; the unbloomed petals lying with their points towards the centre should form a button, and should be the *highest* part of the flower, completing the ball. 4. The flower should be very double. The rows of petals lying one above another should cover one another very nearly ; not more should be seen in depth than half the breadth ; the more they are covered, so as to leave them distinct, the better in that respect ; the petals, therefore, though cupped, must be shallow. 5. *Size*—The size of the flower when well-grown should not be less than four inches in diameter. 6. *Colour*—The colour should be dense, whatever it may be—not as if it were a white dipped in colour, but as if the whole flower were coloured throughout. Whether tipped or edged, it must be free from splashes or blotches, or indefinite marks of any kind ; and new flowers, unless they beat all old ones of the same colour, or are of a novel colour

themselves, with a majority of the points of excellence, should be rejected.

Defects.—If the petals show the under side too much, even when looked at sideways—if they do not cover each other well—if the centre is composed of petals pointing upwards, or if those which are round the centre are confused—if the petals are too narrow, or exhibit too much of their length—or if they show any of the green scale at the bottom of the petals—if *the eye* is sunk—if the shoulder is too high, the face flat, or the sides too upright—if the petals show an indenture as if heart-shaped—if the petals are too large and coarse, or are flimsy, or do not hold their form—in any or all these cases the flowers are objectionable; and if there be one or two of these faults conspicuous, the flower is second or third rate.

Dahlias are propagated by off-shoots, cuttings, and from seed. The show varieties are usually lifted after the plants have been cut down by frost (to which they are very susceptible). The stems are cut close to the ground, when the roots are dug up and left on the surface to dry, but they must not be exposed to frost. They may be stored in any dry, cool place till the following Spring, September. They may then be spread on a floor and a little soil put over them, where they will soon begin to shoot. They may be divided cutting them downwards, taking a tuber with each bit of crown. These may be planted out where they are to bloom, but not before the middle or end of October (probably a month earlier in the North Island). Cuttings taken off the young shoots will root if kept barely moist and in a warm place. This mode of culture is only recommended for choice varieties, and where a little heat can be had. The roots may be left in the ground from year to year, but they will rapidly degenerate. As soon as the frost cuts the stem down clear away the haulm, and put a shovelful of ashes or sand over the crown, or a little earth will be all that is necessary to keep out the hard frost. The younger than will make their appearance in October, when all thunders or ones must be removed, leaving two or at most three for branches. If this is not attended to the bloelection:—small and poor, and the plants will soon berk maroon;

The Dahlia being a soft-wooded plant it must be carefully staked, otherwise high winds will soon render it an unsightly mass of tangled and broken branches. Slugs are very partial to the young wood of the Dahlia, and, if not looked after, a number of plants may be ruined in one night. Dust with fresh-slaked lime a couple of times each week. When Dahlias are planted in beds they should stand three feet apart. It is an excellent plan to put a mulch of rotten manure over the bed three or four inches thick, and lightly cover with soil for appearance sake. This will preserve them from drought, and will afford nutriment when watered either by rain or by artificial means.

Cactus Dahlias.—These are exceedingly showy flowers. Their brilliant flowers render them most effective, and no garden should be without a few of them.

Bouquet, or Pompom Dahlias, are dwarf in their habits, with symmetrical flowers, small and compact.

Single Dahlias. — These, although single, are very effective for growing in borders amongst shrubs, and they are excellent for cutting for decorative purposes. They bear masses of brilliant flowers, and continue to bloom for three or four months.

These Dahlias may be left in the ground all the winter, or they may be lifted and stored as already described. If left in the ground, remove all weakly shoots as soon as they gain six inches long, allowing two or three only to grow: some prefer a single stem. Dahlias are great feeders, and will be greatly benefitted by a dose of liquid manure once a week.

Dahlias grow freely from seed, which should be gathered when ripe, and put away till September. Sow in shallow boxes or pans, and plant out into a nursery bed 6. When the plants are large enough to handle.

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Cactus Dahlias. — These are very showy, and are admirably adapted for cutting. Their graceful airy habit makes them general favourites. Cannell's Favourite, yellow or old gold ; Constance, white semi-double crimson cactus ; Edmund Weekley, intense crimson ; Maid of Kent, intense rich cherry ; Miss Annie Goddend, canary yellow.

Dahlias, Bouquet or Pompom. — These are dwarf-growing, and very compact. Countess von Steinberg, light cream ; White aster, pure white ; Wilhelm Nilsche, red, tipped with white.

Single Dahlias. — These are easily grown, and furnish continuous blooms for cutting. A 6d. packet of seed will supply more than enough of plants to stock a garden, or they may be had from any florist. Empress, white ; Enchantment, soft Chinese red ; Ovid, beautiful yellow.

Pelargoniums. — Single Zonale are without question the most generally useful bedding plants we have. From the time of planting out—October, (November in the South Island, in the North they live out of doors all the year round)—they never cease to bloom. They thrive best in a light sandy loam, which must not be too rich, in which case the plants will grow too strong, producing only luxuriant leaves and few flowers. Another advantage in these flowers is that they require little or no attention during the Summer months. Unless the weather is exceptionally dry they will not require any water. The following varieties can be highly recommended, as they will afford a nice selection of bright colours :—Henri Jacoby, dark crimson ; Joan d'Arc, pure white ; John Fellows, dark crimson ; Lady Byron, beautiful pink ; Lady Darby, salmon ; Lady Sheffield, violet, purple, pink : Mr. H. Cannell, crimson, scarlet ; Purple King, purple ; Rev. H. Atkinson, crimson ; Salmon Vesuvius, rich salmon ; Scarlet Cloth, rich scarlet.

Pelargoniums, Double Zonale. — These are very effective in the flower garden ; but as they usually grow taller than single Zonales, they should be planted back in the borders or in the centre of the beds. They are also very effective for window culture. The following will be found a nice selection :—B. K. Bliss, orange, scarlet ; Black Knight, dark maroon ;

General Faure, salmon centre, white edged ; Gold Finder, orange yellow ; Wonderful, scarlet ; Lord Derby, rich pink.

Ivy-leaved Pelargoniums.—It is only of comparatively recent years that ivy-leaved Geraniums have taken their place amongst the most desirable of our bedding-out plants. They are admirably adapted for pegging down. They soon cover the ground with their pretty ivy-like leaves and profusion of beautiful flowers. The ground must not be too rich. The best results we have seen have been when they were planted in rather poor, sandy soil, each plant receiving a small shovelful of good compost when planted ; the compost kept them growing vigorously for a time while they were making wood. The following are a few choice sorts :—Alice Crusse, magenta ; Gloire d'Orleans, rich crimson ; Joan d'Arc, double white and lavender ; Masterpiece, magenta, crimson ; Souvenir de Charles Turner, deep pink.

Pelargoniums, Tricolour varieties. — These beautiful foliage plants are not such free growers as those above referred to ; but when planted in beds they are strikingly effective, particularly so if edged with blue Lobelia, Lobelia Compacta.

Regal and decorative varieties.—These fancy Pelargoniums, from the fancy nature of their blooms, are best adapted for greenhouse culture, although many of them do well out of doors, especially in the North Island. Like the Zonales, they will produce too much wood and leaves, and very little bloom, if planted in deep, rich soil.

To make Cuttings of Geraniums, Zonale and Ivy-leaved may be taken in February or March. The cuttings must be taken with care, so as not to destroy the appearance of plants which will still be in full bloom. The proper way to take cuttings is to cut off the tops of the branches, or the lateral shoots, each cutting being about three inches long. Cut off at a joint, trim off the lower leaves, and the cutting is ready for planting. Shallow boxes, from four to six inches deep, are the best. Kerosene cases cut in two, the flat way, make excellent boxes for cuttings. Bore a few holes in the bottom, then fill them with compost composed of fresh soil, sharp sand, and a little rotten leaf mould, or well-decomposed manure ; about two-thirds of

the former, and one-third of the latter. Any kind of soil, however, will answer, but the compost is the best of all. Fill the boxes to within half an inch of the top, press firmly with the hand or a flat board, put the cuttings in (with a planting stick, about as thick as a man's little finger), inserting them about two inches deep, and firming the soil about each cutting as it is planted. Give a light watering with a fine rose, and the operation will be completed. Place the boxes in an open position, exposed to the full glare of the sun. Stand them on bricks to keep out the worms, or on a gravel walk. The cuttings will take root in about three weeks, the exposure hardening them off so as to render them fitted to go through the winter. By the middle of April they should be well rooted, and can then be removed to the greenhouse, or cold frame, or failing either of these, they may be placed on a verandah facing north. In this position it will be necessary to cover the boxes with canvas or sheets of brown paper when frosts prevail. It is important that plants which have been touched by frost in the least degree, should be lightly watered with a fine rose and shaded from the rays of the sun for a few hours. This causes the frost to thaw gently, and no harm is done. If, on the other hand, the sun is allowed to reach frosted plants, they thaw too rapidly, the sap cells burst, and the plants suffer materially; and if repeated, they will ultimately die. If kept in a cold frame (by which is meant a frame covered with glass) the sashes should be drawn up every fine day, taking care to replace them in the afternoon. A few mats, or a covering made of old sacks, should be spread over the glass every night. There is very little trouble in carrying out these simple instructions; it is only a matter of regularity. Those who have a real taste for their garden will not consider the trouble.

Pelargoniums which were planted out in the Spring may be lifted after the first frost, the branches trimmed back half their length, and planted in nine-inch pots, three in a pot, and placed on the back shelf of the greenhouse, in a cold frame, or in a window of the house. Or they may stand on the verandah, a long box—twelve inches wide by

nine deep—may be packed with old plants, covering the roots with fine soil.

These old plants may be planted out in October. They form fine bushy plants, flowering almost at once, and continuing to do so till the following Winter. Where the soil is too rich or too damp, Pelargoniums may be planted in their pots, sinking the rim of the pot an inch or two below the surface of the soil. In this way they grow less robustly, flower more freely, and are easily lifted and housed during the Winter. After the second year it is better to discard the old plants for younger ones. Pelargoniums of all kinds may be grown from seed, but all kinds do not produce seed freely; September is the time for sowing it. Sow in pots, pans or boxes, cover with a quarter of an inch of fine soil.

Roses. — The Rose, the queen of flowers, has a beauty and fragrance which is scarcely attained by any other family of plants. It should find a prominent place in every garden. There is no kind of shrub, however beautiful, that is used to ornament a garden scene, so well adapted to take various forms as the rose. Like most other flowering plants planted for effect, Roses are most effective in groups or beds of distinct colours. It can be used as a dwarf, tiny plant to fill the smallest bed; as a bush to plant amongst other shrubs; as one to plant in beds of large dimensions in groups; as a tall standard. Standards can also be planted in groups on a lawn. These, also, are planted in the centre of a large circular bed, with half standards around them and dwarfs in front, thus forming one of the finest sights in the garden when in bloom. The rose is also admirably adapted for covering old fences or banks; but there is no form which shows off the glory of the Rose to equal the effect produced by training up pillars or poles. Three poles placed as a triangle, and tied firmly at the top with tarred rope or wire, will stand the strongest gales. Should this plan be adopted, three different varieties may be planted, one at the foot of each pole, and trained from pole to pole so as to completely hide them when in full foliage and flower, they will then form a beautiful pyramid of flowers.

Roses require generous treatment before planting. The ground should be deeply dug, and a good coat of well-rotted manure incorporated with the soil some time before planting. The ground must be naturally dry, as they are particularly impatient of stagnant water about their roots. Under such conditions the rose cannot flourish. The leaves will be mildewed, the flowers small, and the wood unhealthy and cankered. These remarks apply to all kinds of roses.

Planting.—As soon as the Summer's growth has been completed, roses may be lifted and planted where they are intended to stand during the ensuing Summer. They may however be planted any time during the winter, provided the land is dry enough. Roses would be greatly benefited by a little liquid manure once a week during the early summer months. As soon as the blooming season is over (April or May) it is a good practice to cover the beds with well-rotted manure three or four inches thick. Sprinkling a little earth over all for appearance sake.

Pruning.—This is a most important operation, and cannot be better described than in the language of Mr. Paul, one of the most successful rose growers in the United Kingdom. He says:—"When about to prune a rose, I first look at the name, that I may know the habit and character of the variety I have to deal with. I must know whether it is a Summer or perpetual bloomer, a strong or weakly grower, and whether the flowers are produced fine from low, middle, or top eyes, indiscriminately or not. It is only by knowing and considering these points that we can prune with accuracy and success. It is an axiom in rose-pruning that the more vigorous in habit a plant is the more shoots should be thined out, and the less should those that are left be shortened in. This has in view, in particular, the production of flowers in the most perfect condition. The eyes near the base of those kinds which form short shoots (especially the Autumnals), usually produce the best flowers; and in the vigorous growers we prefer, for the same reason, the eyes about the middle of the shoot, or nearer its summit, if the wood is well ripened.

All roses make two growths in the year—first in Spring, and again in Summer, shortly after they have flowered. Some of the Autumnals start afresh at short intervals, throughout Summer and Autumn. We shall at present speak only of Spring and Summer growths. When the shoots formed in Summer are well ripened, we prefer them; and for these reasons. The growth at that season is generally more rapid, and the shoots, although usually of less strength, are freer in the bark; the eyes are more prominent and plump, and well stored with the juices required to supply nourishment and promote growth. The above remarks refer to dwarf roses on their own roots, as well as to those on other stocks.

In pruning, the heads of standard roses should be well thinned, much more than is usually the case. Thin out all weak sprays and cut back all shoots to the eye that points in the direction in which the future growth is desired. With young heads, of course, it is essential that the wood should be left sufficiently long to form the head; but where the heads are large, having attained their full size, the wood should be pruned back to two or three eyes. Dwarf roses planted fresh from the nurseries this year should, at pruning time, be cut back to within six or eight inches of the soil, care being taken to leave all the buds just below the cut pointing outwards. If this is done the bushes will become fine plants and yield grand flowers during the coming season, while those left unpruned will produce roses poor in quality, and the bush itself show small growth.

When roses are grown for general effect as well as the production of individual blossom, pruning must be as follows: the weaker growths must be pruned back to a few eyes, and the stronger growths left, one, and even two feet in length. But these latter should be tied down either to stakes, or pegged down, so as to preserve the symmetry of the beds. By adopting this method a check is put upon the stronger shoots, while weaker shoots reap the benefit.

Roses may be pruned any time between June and the end of August. We often find that early pruned roses start into growth early in spring; they are invariably caught by late frosts when the young growths receives a great check.

For these reasons many prize growers defer the pruning till August, which keeps back the growth. The greatest objection we see to this is that the roses look untidy all the winter through. We would recommend that the pruning of some at least of the roses should be deferred till August of each year. This would prolong the blooming season by at least a month. In those districts where late spring frosts are not experienced the above precaution need not be taken.

Rose Cuttings.—The prunings may be used for this purpose, selecting the medium sized well ripened shoots; take off a couple of inches of the slender top; plant in rows six inches apart and four inches cutting from cutting, in a moist shady border. A little sharp sand about the roots of the cuttings will cause them to root more freely. Cuttings planted in May or June will be ready to plant out in about a year.

Budding.—This interesting operation should be performed in December and January, or when the bark can be easily raised, or made to part from the wood with ease. (See note on budding.)

Roses in Pots.—Roses are sometimes grown in pots for exhibition and decorative purposes. Any good rich soil will answer, but they thrive best in fresh loam, that is, the upper surface of an old pasture and old hotbed manure, a dust of sharp sand and a small quantity of quick lime, all well blended, three parts of loam and one of manure. April is the proper time for potting. Before potting examine the plants to see if there are any embryo suckers; if there are, carefully remove them. It is useless to attempt growing roses in pots without glass and plenty of room. They must be pruned well back each season. Beautiful specimens may be grown as directed above.

Yellow Briar Roses.—Roses of this class are peculiar in their flowering, and therefore require peculiar pruning; they are very early bloomers, and make no wood previous to flowering. They generally put forth the leaf and bud about the same time; it is, therefore, necessary that as much as possible of last year's wood be retained particularly the ends of the branches, from whence most of the flowers proceed.

The method that must be pursued in order to get as much flowering wood as possible is not to prune them when other roses are pruned, but shortly after they have done flowering, leaving three or four branches a little shortened. The rest must be cut well back, when they will make good flowering wood the remainder of the season and ripen it well.

Nursey-men describe their stock of roses under the following headings, viz., Hybrid perpetual, Moss, Tea scented ; Hybrid Tea, China Noisette ; Bourbon ; Polyantha ; Summer ; and Hybrid Ayrshire.

The following is a choice selection suitable for a small garden, and the abbreviations are as follows : H.P., Hybrid perpetual ; M., Moss ; T., Tea scented ; H.T., Hybrid Tea ; C., China ; N., Noisette ; B., Bourbon ; Cl., Climbing ; P., Polyantha ; S., Summer ; H.A., Hybrid Ayrshire ; C.L., Climbing and Pillar Rose :—

Adam T., Pale salmon rose.
 Anna Oliver T., rosy flesh and buff.
 Banksia, white cluster, very sweet.
 Banksia, yellow cluster, very sweet.
 Cl. Devoniensis T., creamy white, blush centre.
 Cloth of Gold N, pale sulphur yellow.
 Crimson Rambler C., bright crimson, in clusters.
 Duke of Teck H.P., bright crimson.
 Duke of Wellington, H.P., bright velvet red.
 Ernest Metz T., soft carmine rose.
 Fortune's Yellow H.A., yellow shaded bronze.
 Gloire de Dijon T., yellow and buff.
 Grace Darling H.T., creamy white.
 Lady Helen Stewart H.P., bright crimson scarlet.
 La France H.T., pale peach.
 Lord Macaulay H.P., rich scarlet crimson.
 Marechal Niel T., beautiful deep golden yellow.
 Mrs. Paul B., blush white with rosy peach shading.
 Perle d'Or P., nankeen yellow.
 Red Provence M., red.

Roses suffer very much from the attack of green fly early in Spring. Syringing with cold soap-suds in the evening, and syringing in the morning with cold water will

destroy the fly. The spray must be applied with force. Cold water alone, if applied every second day, will banish the pest.

Chrysanthemums.—In beds or borders these are, perhaps, the easiest of all plants to grow; there are, however, one or two points which must not be neglected. If fine, rich masses of bloom are to be secured, the plants must be taken up every two years and divided, leaving but one or two shoots. They must not be allowed to suffer from want of water while they are growing, and should have a little liquid manure once a week (see “Liquid Manure”). Transplanting may be done at any time from May till September. The soil best adapted for growing chrysanthemums is fresh loam in good condition. Few plants have been improved more by skilful cultivation than the chrysanthemum. The varieties may now be counted by the hundred.

Messrs. Nairn and Son, of Christchurch, who have made a speciality of growing these flowers, truly remark that “Chrysanthemums, which have been aptly described as ‘summer’s last smile,’ have of late years become one of the most popular flowers in the horticultural world; coming into bloom late in the Autumn, they continue well into Winter giving the garden quite a gay appearance after all the Summer flowers are done. They are so easy of culture that any one may grow them. In Spring, cuttings or small pieces should be taken from the old plants, and when well rooted should be planted out where they are to bloom. About the middle of December they should be cut back to 6 or 12 inches from the ground. The result will be nice bushy plants covered with blooms of fine quality. In January they should be neatly staked, and as they grow tie to same, cutting out all weak branches. When the flower buds are formed, some of the side buds should be thinned out, to enable those left to come to perfection. Chrysanthemums are rank feeders, and we find that mulching with well rotted manure around the plant is the most effective way of feeding them.”

Growing in Pots for Decorative Purposes.—Cuttings should be taken from the growing plants in December, about three inches of the top. Thin the lower leaves off, plant four in a four-inch pot in sandy loam, water well and shade for a few days till the cuttings lift their heads. They will soon root, and should then be transplanted, each into a four inch pot. It is a good plan to plunge the pots, placing them in saucers or on slates to prevent the roots striking down into the soil. Fill round about the pots with earth: this will keep the roots cool, and at an even temperature. Water once a week with liquid manure. Mulch the surface as directed for plants growing out of doors. Chrysanthemums in pots must not be allowed to suffer from want of water, otherwise the lower leaves will fall off, and the beauty of the plant is gone. If the plants grow too vigourously, it will be necessary to shift them into pots a size or two larger; water well, re-plunge in soil, cinders, or tan, and mulch as before. The advantage of mulching is that each application of water carries with it some of the fertilizing properties of the manure. At the approach of frost the pots should be lifted, washed, and placed in the greenhouse or window, where they will bloom freely, continuing to do so long after those in the open have been cut off by frost. There are two distinct classes of Chrysanthemums, described as Japanese and Chinese or large flowering varieties. Chrysanthemum blooms may be grown to a great size by planting in rich soil, and thinning out all the branches but one or two well-selected ones, and removing all side-shoots as they appear; the blossoms must also be removed with the exception of one or two on each stem. Liberal supplies of weak liquid manure must be given while the plants are blooming; with this treatment blooms may be produced as large as good-sized roses. This treatment is only desirable when blooms are required for exhibition.

The following are a few of the best large and small flowering Chrysanthemums:—Aurea multiflora, bright yellow; Beverly, large, ivory white; Empress of India, white; Globe, white; Gloria Mundi, brilliant golden yellow; Golden Beverly, canary colour; Hereward, purple;

Lady Harding, deep rosy lilac. Small flowered or Pompones—Amphilla, bright red; Bou le Rose, orange; Golden Aurora, yellow; Mrs. Talfour, white.

Verbenas.—As evidence of how rapidly this desirable dwarf-growing plant has been improved and increased; it is not so many years since the old scarlet *Verbena Maleindris* was the representative of the family. This familiar old plant may be seen covering the ground with its compact growth and small scarlet blooms. Now they are to be had in all shades—white, red, pink, blue, rose, crimson, and plum, etc., etc.

The Characteristics of a Show Flower.—1st. The flower should be round, with scarcely any indenture, and no notch or serrature. 2nd. The petals should be thick and flat, and bright. 3rd. The plant should be compact, the joints short and strong, and distinctly of a shrubby habit or a close ground creeper; those which partake of all are bad. 4th. The trusses of bloom should be compact, and stand out from the foliage, the flowers touching each other, but not crowding. 5th. The foliage should be short, broad, and bright, and enough of it to hide the stalks.

The colours should be perfectly clear and distinct in selfs, no shade should prevail, and in stripes the line where the colours separate should be well defined. The form of the truss should be as nearly flat as possible, so as to show off every individual flower to advantage. Verbenas thrive best in sandy loam, moderately rich, and will live out of doors throughout the year in the North Island. They are, however, greatly improved by being renewed at least every two years. They are very effective. Grow in masses, pegged down. Plant in October or November.

Large quantities of strong, well-rooted plants may be obtained with very little trouble, if undertaken at the proper time. Shallow boxes, say four inches deep by one foot wide, will answer, having two or three auger holes in the bottom for drainage; put one inch of rough cinders, broken pots, or chopped sods, and fill up with compost, composed of fresh loam, decomposed leaf mould, and sharp

sand—two parts of the former and one each of the latter. Any ordinary soil will answer if fresh loam cannot be had. Sprinkle the surface with sharp sand. Press the compost firmly in the boxes, and water well the day before planting the cuttings. The cuttings should be taken from the parent plant early in March. Select the young shoots which have no bloom upon them. Cut at a joint, trim off the lower leaves, and insert the cuttings in the soil about two inches deep, and two inches one from the other. Press the soil against each cutting with the planting stick (which should not be more than six inches long with a blunted point.) The cutting should not be more than three inches long. As each box is filled with cuttings as directed, it should receive a gentle watering, just enough to settle the soil about the stems; remove the boxes at once to the cold frame, where the sun cannot reach them. Sprinkle gently with a syringe every fine evening, and keep the frame closed until the cuttings begin to grow, when air may be admitted gradually. If *Verbena* cuttings are once allowed to flag, it is rarely that they can be revived (except placed in a gentle heat.) In this country *Verbenas* require very little protection from frosts. They will live through the Winter standing on a verandah facing north. Water only when absolutely necessary. An occasional soaking in fine open weather will be better than frequent sprinklings. The great point to aim at in preparing young stock to be kept through the Winter, is to have the plants well rooted before the cold weather sets in.

Calceolaria, or Lady Slipper. — *Calceolarias* are divided into two classes — the hard wooded, and the herbaceous and shrubby. The former can only be grown successfully under glass, owing to their fragile nature. The latter are only suited for outdoor culture. Well-grown plants of the herbaceous order are objects of great beauty. They, however, require a large share of attention.

Characteristics of a good Flower.—If the flowers are equally good, the more shrubby the plants are the better, as the foliage makes a fine background for the flowers. The larger the flower the better it will be, provided it is circular

in outline, without crumples or serratures, and convex or globular in shape instead of flat; the mouth of the purse cannot be too small; the colour should be bright, if a self (all one colour); and if spotted, or blotched, the ground colour should be clear and distinct, and the spots, &c., well marked, not running or fouling into each other, or feathering into the ground colour.

Herbaceous Calceolarias may be propagated by seed or by cuttings. Great care must be exercised in preparing the pans or boxes for the reception of the seed, which is very small. Fill the pan, or box, or pot one third of its depth with fine broken crocks or cinders; over this place an inch of broken-up turf, or the screenings of the compost. Then water with a fine rose till the compost is thoroughly well soaked. Let them stand till next day to drain. Fill up to within a couple of inches of the top with finely-sifted mould—three parts soil, the other part sharp sand—press firmly, and secure a level surface. Sow the seed. A good pinch will suffice for a box or pan 12 x 10. Cover with the merest dust of the finest-screened mould, and press gently with a bit of glass or a slate. Seed sown in February will produce fine flowering plants in the following November and December.

Potting Seedlings.—In the meantime the young plants must be carefully potted and re-potted as they continue to grow. *Calceolarias* do not require a high temperature. So long as the glass does not fall below freezing point, they will continue to grow throughout the greater part of the winter. Green fly is the chief trouble in growing these plants. As soon as they appear the house should be fumigated with tobacco, or tobacco paper (see Fumigation). *Calceolaris* will not brook neglect in the matter of watering, which must be given freely when required. The pots should never be allowed to get quite dry.

Shrubby Calceolarias are as hardy as the herbaceous are tender.

Petunia.—1. *Form.*—In Show Petunias the flower should be round, without notches on the edge, and it should be rather inclined to cup, that is, the outer edges

should not bend back. 2. *Substance*.—The petals should be stout, and able to keep the form nearly as long as the colour lasts perfect. 3. *Colour*.—When a self, it should be clear without fading at the edges ; when striped, each stripe should be well defined, and each colour distinct. 4. *Size*.—Each flower should be at least one and a half to two inches across ; if large they are liable to bend back. 5. *Habit*.—The plant should be rather dwarf, and produce flowers abundantly ; the foliage should be rather small, in order that every flower may be seen distinctly.

The annual and perennial varieties of this showy plant are easy of culture, from cuttings or from seed. They thrive in any good garden soil. Annual Petunias may be sown in September, in pans or boxes, and placed in the greenhouse or in a cold frame, or, failing this, on a verandah, in which case the box or pan should be covered with sheets of glass. As soon as the plants have grown two or three leaves, remove the glass and keep moderately moist. Single petunias are most effective for growing in masses. If sown in September, they will be ready for planting out in November. Water the plants well the evening previous to planting out. In sowing Petunia seed, which is very small, it is a good practice to saturate the soil when the pans are half filled with compost, and allowing it to stand till next morning, then fill up to within two inches of the top with fine mould having a little sand in it ; press down firmly, leaving the surface quite level, then sow the seed, covering it with merely a dust of fine mould and sand mixed. Press gently. The moisture from beneath will keep the surface moist till the seed comes above ground. Perennial Petunias may be propagated by cuttings. The young shoots or tips of the branches will strike freely, and in two months' time will be nice robust flowering plants. They may be grown out of doors, or in a greenhouse or a window facing north or west. The single varieties are, however, best for outdoor culture. For potting a rich sandy loam is required. As the plants grow, and the pots become filled with roots, they will require to be shifted into larger ones, taking care not to break the ball of earth.

Fuchias. — These flowers are, perhaps, the most graceful of all our greenhouse plants when well grown. They are easy of culture, and flower continuously from November till the end of Summer. They delight in rich, loamy soil. Almost all the varieties will flourish out of doors, requiring no attention beyond staking and a good soaking of water in dry weather.

Grown for show purposes there are certain characteristics which must be present as set forth by the authorities already referred to, as follows:—Commencing with the tube a first-rate fuschia should be well-proportioned, neither too thick nor too long; one inch and a half is a fair length, but if it is stout in proportion two inches might be allowed: the sepals or flower cups should stand at equal distances, and should be broad at the base, gradually tapering to the end; they should be reflexed a little above the horizontal line, but not turned up so high as nearly to meet the tube: the corolla should be large and well rounded at the end, so that when the flower is turned up it may have the appearance of a little cup; the stamens and anthers at the top of them should project well out of the corolla; and the filament bearing the stigma must project considerably beyond the anthers; the stigma itself should be larger than the anthers, and should be of a clear white, so as to contrast well with the purple or crimson corolla. The colours should be clear and bright; the tube would be improved if of a waxy appearance, bright, and shining. If white, that white should be pure, not a pinkish white, but clear as the driven snow. The corolla should be of a clear colour, untinged by any other. The flower-stalk should be long enough to allow each flower to be seen distinctly from amongst the leaves. The habit should be rather dwarf than tall, and the plants should produce bloom when a foot high." This perfection can only be secured by careful cultivation in pots under glass. Fuchias are very impatient of sunlight. After they once commence blooming the house should be kept shaded and well ventilated. Some of the best specimens we have ever seen flowered under canvas. A cold frame covered with calico

or scrim answers admirably, and prolongs the period of flowering.

Propagation.—Fuchias are propagated by seed and by cuttings. The seed must be gathered as soon as ripe, which will be when the pulp in which the seeds are imbedded assumes a dark purple colour. The seed pods should be placed in a small gauze bag, and squeezed and washed in water. By this means the seed will be freed from the pulp, when it can be dried and stored away till September or October, when it should be sown in shallow pans or pots. As soon as the young plants are large enough to handle, transplant them into three-inch pots or boxes, filled with rich loam. When they are four or five inches high, they will require a change of pots. Plant them in four-inch pots, and place in a cool, shaded corner of the greenhouse, or cold frame, and water freely for a few days till the young plants recover their strength. Syringe, or water with a fine rose, every evening in warm weather.

By Cuttings.—Cuttings may be taken twice a year ; in Spring and Autumn. As soon as the parent plants commence to make young wood, snip off the tender shoots, and plant separately in thumb pots, or in boxes or pans in fine rich loam (one-third sharp sand) ; the pots must be well drained and thoroughly clean. Shade the cuttings for a few days. They will root in about three weeks, and should then be shifted. Turn the pots upside down, and if roots are to be found protruding from the drain hole, the plant requires a larger pot.

Fuchias of all kinds grow and flourish out of doors in New Zealand. They require to be supported by stakes or wire netting, as already described ; we prefer the latter. They continue to produce dense masses of bloom till the frost cuts them down in June or July. Then clear away the old wood, cutting it close to the ground. A shovelful of ashes laid over the crown will protect it from severe frost : even this precaution is hardly necessary. Our fuchias lived through the heavy frosts of July and August, 1895, without any covering whatever over the roots. They will last for several years without deteriorating. Fairly fine

bone-dust will suffice for top-dressing the soil, a $\frac{1}{2}$ lb. to the square yard. Within the last two or three years fuchias have suffered in some houses to a great extent from a white-winged insect, which attacks the underside of the leaves, putting a complete stop to the growth of the plants. Fumigation with tobacco or tobacco paper has had a good effect. A plentiful supply of water-syringing has also its beneficial effects if persevered with.

Winter Treatment.—As soon as the bloom is over, set the young plants out-of-doors in some open place in the garden. When the frost begins to appear take the plants under cover, either under the stage of the greenhouse or in a back shed, where the severe frost cannot reach them. Here they may remain without water till the potting time comes round again.

On the Cultivation of the Camellia.—This lovely plant grows and flowers out of doors as freely as a laurel bush, particularly in the North Island and as far south as Nelson. It grows luxuriantly in many localities in Canterbury and further south, but it must be sheltered from high and cutting winds and frost. It will grow in any good garden soil in good heart. In making up a bed for camellias give a dressing of peaty soil, and a little sand.

Growing Camellias in Pots.—The soil best adapted to the growth of camelias is a mixture of peat earth, loam, and well decomposed leaf mould, or thoroughly rotted cow manure in equal proportions. The earth should be well mixed and passed through a coarse sieve, reserving the detached portions of peat and loam that will not pass the sieve, to fill in over the broken crocks in the bottom of the pots, thereby securing a free drainage—a circumstance indispensable to the success of the plants. The proper season for the general shifting is when the young growth has hardened, and the blossom buds for next year can be detected at the extremity of the shoots. After shifting all those that require it, they may be placed in a cold pit or frame, or retained in the greenhouse, according to the season they are wanted to flower; if kept in the greenhouse, as much air as possible should be admitted,

occasionally sprinkling the foliage will improve the appearance, as well as be beneficial to the health of the plants. They will stand on a south border, and do very well till Autumn. At all times attention must be paid to watering them properly, the roots being apt to become matted in the pots, so as to render the ball of earth impervious to moisture; hence it is necessary to see that the ball of earth is moistened by the water poured upon it, instead of the web of fibres only. This renders an examination of the roots, or reducing and replanting them once a year, a measure indispensable. The usual methods of propagation are by grafting and budding on the single camellia grown from seed.

Blooming Mignonette in Winter.—The blooming of this universal favourite may be continued throughout the year by a little management on the part of those who possess a cold frame or a greenhouse. To accomplish this the seed should be sown in the beginning of February, in pots of any convenient size. The soil should be good loam, moderately enriched with well-rotted farm-yard manure. It is essential that the pots be thoroughly drained. After sowing the seed, set the pots where they will not require frequent waterings, too much moisture being extremely injurious to Mignonette; for this reason, therefore, it will be safer to place the pots in a frame or pit, where they may be covered by the lights in rainy weather. As the plants increase in size they should be gradually thinned, ultimately leaving three in each pot; but one strong plant will suffice, and will make a better plant. Nip off every flower bud as it appears, give water only when the plants really require it, and then in sufficient quantity to moisten the whole of the soil—not dribbling a few drops over the plants to-day to prevent them from being dry to-morrow, a practice too much followed with plants in pots.

Continue to pinch off any premature flowers that may appear; keep the pots free from weeds, and far enough asunder to prevent the plants from being crowded, and when they are removed to Winter quarters set them near the glass in an airy situation. Plants treated in this manner

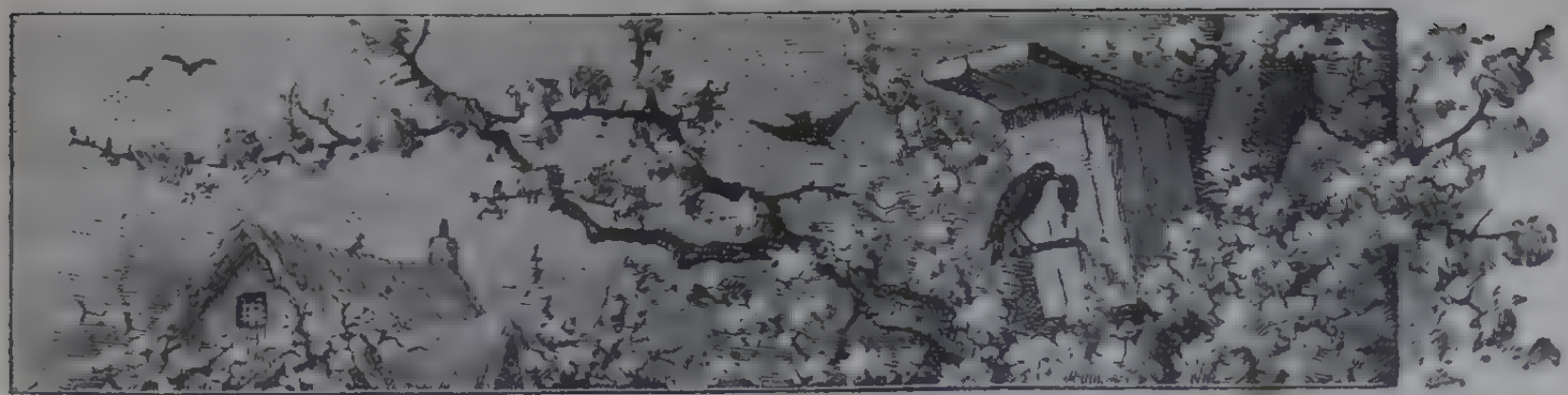
will form nice bushy plants, and will flower through the Winter months. This method of having Mignonette through the Winter costs very little trouble, and will well repay the time bestowed upon it. Mignonette blooms freely enough in well-sheltered places out-of-doors in Winter even in Canterbury.

Standard Geraniums.—It is an axiom in flower culture that at least for the amateur one fine, well-grown specimen is worth more than any number of spindling, over-crowded, or sickly plants. No plant responds more readily to careful and generous treatment than the Geranium. A correspondent of *Gardening* gives the following report of experience in training a fine specimen:—It takes two or three years, and a great deal of patience, to train a Geranium to four or five feet high with a good head, but when achieved it thoroughly repays itself. A Vesuvius Geranium grown by me some years ago is now a standard six feet high, giving a profusion of bloom eight months out of the year. During the Summer months last year it had forty to forty-five fair trusses of bloom (outdoors), and continued giving a few trusses up to the beginning of this year. It has only been potted three times during its growth, and always has plenty of liquid manure while in flower. A good subject to commence with is a lanky Geranium that has survived the Winter, such as is generally to be found in most collections. Carefully pinch off any side shoots there may be, and re-pot in a fairly rich compost; the stem should be tied to a stout stick, and made as straight as possible. Now all that is necessary is to nip off all side shoots and flower buds the moment they appear, and give twice a week liquid manure. When sufficiently tall, pinch off the top, which will at once induce laterals; it will then, with judicious training, form a good head, and when this is achieved, it can be allowed to bloom. The growth will be greatly retarded if the plant is allowed to flower before the training process is over; in fact, it will simply take twice as long to arrive at anything like a standard."

Manuring the Flower Garden.—Although flowers require a generous soil, care must be taken not to overdo the

enriching. In forming a flower garden, it is well to dig and trench in a liberal supply of thoroughly rotted manure. After this operation, the future necessary enrichings may be done by top-dressing and forking-in. My own method is to top-dress in Winter with rotten manure, or failing this, with bonedust, 3 lbs. to the square perch. My little flower garden has not had a spade in it for the last seven years. It was, however, deeply trenched in the first instance. I use a strong push hoe, and work the soil with it to a depth of six or seven inches. Few amateurs have a more brilliant display of Summer and Autumn bloom than I usually have. My soil, however, is a loose, sandy loam; such plants as Hyacinths, Tulips, Ranunculus, Dahlias and Roses must, however, have the soil specially enriched for them. When bedding out Summer plants, such as Pelargoniums, Verbenas, Lobelias, Phloxes, etc., I put a trowel full of compost (such as used for potting) under each plant, for the purpose of giving them a start. This is not absolutely necessary, especially if the garden soil is in good heart. The strong growing varieties of single and double Geraniums will flower better in rather poor soil so long as they get a good start.





THE GREENHOUSE.



NOTHING adds so much to the pleasure of those who have a taste for gardening, as the possession of a glass house, however small it may be. Timber and glass are now cheap ; and any amateur (at all handy with carpenters' tools) may, at a very little cost, erect a house suitable for his purpose.

The greenhouse, and indeed, all garden frames should receive two good coats of paint every three years, inside and outside. Before commencing to paint remove all plants from the house. Take one pound of sulphur, place it in three or four pot saucers about the house, set fire to it and close up all ventilators and leave till morning ; then wash all the woodwork with soft soap and soda. When thoroughly dry the painting may be commenced. The house should receive a scrubbing once a year. If these instructions are attended to, there will be little trouble from red spider, mealy bug, or thrip.

The house represented in the frontispiece is a fac-simile of one built entirely by the author in his spare moments

(with the exception of a few pounds paid for assistance while erecting the roof and putting in the glass). Length of house 18 ft. by 11 ft., height of sides 5 ft., height to ridge 9 ft. The structure is composed of wood and glass. The total cost has been £25, this is exclusive of the heating apparatus, which cost £5.

The method of heating which we have permanently adopted for its economy is a brick flue running the entire length of the house. The fireplace is built of fire clay bricks under the stage, but fed from without; the flue terminates in a chimney at the far end of the house. The bricks absorb the heat, and as the fire slackens the heat is given off and keeps out the frost. One ton of Malvern coal, and two bags of Newcastle slack, and a little wood is all that is required to keep the fire going during the cold months of Winter.

Every greenhouse should be supplied with a heating apparatus to be used during severe weather in Winter, lacking which, it will be difficult to save tender plants. For very small houses a kerosine lamp or two will suffice to keep out frost. We must, however, state that we have not found kerosine entirely satisfactory. It is more expensive than coal, and does not do the work nearly so well. A cold frame is also indispensable for the successful working of a greenhouse. If built of brick, all the better, as there will be less trouble with vermin than if constructed of wood.

CALENDAR OF WORK TO BE DONE IN THE GREENHOUSE DURING THE YEAR.

Commencing with July. — Admit air on every favourable occasion, especially amongst Heaths, Epacris, and Azalias, not required for early blooming. During dull, frosty, and foggy weather, such as is frequently experienced at this season, a little heat will be of service, as it promotes a circulation of the stagnant air, which is beneficial to growing plants. The most forward fuchias may now be pruned and repotted. Pelargoniums and Cinerarias will, in

like manner, require cleaning and fumigating. The first may now be repotted for late November and early December blooming; and the latter must be shifted and kept growing, so as to prevent them throwing up flower stalks, if late bloom and late specimens are desired. Place a few *Achimenes*, *Gesnera*, and *Gloxinia* roots in heat, if available, for early blooming; a medium temperature of 50° will answer for these plants.

August. — Admit air freely amongst hard-wooded plants, such as *Camellias*, *Azaleas*, *Ericas*, and *Epacris*, when the weather is fine. In damp, foggy, or frosty weather use a little firing to dry the air, and promote a free circulation. Water only when the plants are getting dry, and then do so copiously. *Azaleas* and *Camellias* will now be coming into bloom, and must be supplied rather liberally with water. Bulbs, *Cinerarias*, and *Primulas* in flower will be the better for a little weak manure water once a week. *Calceolarias* and *Pelargoniums* require plenty of light. *Fuchsias* should now be started in a gentle heat. *Achimenes*, *Gesneras*, and *Gloxinias* may be potted. Insects will now be getting troublesome, and the best antidote is tobacco fumigation; but, above all, cleanliness and good cultivation. Syringing with water has been found advantageous; the greenfly cannot stand a dash of cold water at this season of the year. Syringing must, however, be done in the morning during the Winter months. Old plants of *Scarlet Geraniums* stored in boxes, in sheds, or other temporary shelter, should be kept free from mould and damp by removing all dead or decaying leaves. Water must only be applied when the pots are quite dry.

September. — Admit an abundance of air in fine weather. An occasional fire in damp or frosty weather will be required to dry the atmosphere. *Camellias*, *Calceolarias*, and *Cinerarias*, now in bloom, will require a liberal supply of water, with liquid manure once a week; avoid giving liquid manure to *Heaths*, *Epacris*, and *Azaleas*; shade on sunny days. *Heaths* and *Epacris* require an abundance of air when growing and flowering. Continue the occasional

use of manure water for Primulas. Train large plants of Pelargoniums intended for early flowering ; stop those for late Summer and Autumn blooming. Shading must now be attended to ; as the sun gains strength this will be all the more necessary, particularly for such plants as Calceolarias, Fuchsias, Azaleas, etc. A sowing of Asters of sorts, Ten-week and German Stocks, Phlox Drumondii, Gazaneas, Balsams, Primula Sinensis may now be made for early Winter blooming. Pelargoniums, single and double, and ivy-leaved, which have been wintered in boxes, may now be potted in three-inch pots, and watered. They will fill their pots with roots, and can be turned out into the flower beds in November without suffering in the least. It is not absolutely necessary to adopt this plan, as they could be put out direct from the boxes ; but we find that it pays well to take the extra trouble.

October.—Admit air freely on all fine days. All flowering plants will require an abundance of water. Growing plants will be greatly improved by the occasional use of a fine syringe, avoiding those in full bloom. Manure water may now be given more freely to Pelargoniums which have commenced to bloom.

November.—Great attention must now be paid to ventilation—leaving a little air all night—increasing it as the month advances. Young shoots of Heaths, Epacris, and Azaleas, &c., may now be struck in a compost, for the most part composed of sharp sand. They will strike more surely under a Bell glass ; in any case these plants take from four to six months before they are well rooted. Stir the surface of pots. Syringing and watering must now be carefully attended to ; plants with large leaves require most water. Syringing should only be done after sunset.

December.—Admit air freely. Seeds, such as Cinerarias, Calceolarias, and Primulas, may still be sown. Many Winter and early Spring-flowering plants, such as Daphnes, Heaths, Azaleas, Camellias, and Deutzias, &c., &c., may now be set out of doors, in a cool and sheltered place, to make room for other plants coming forward. The plants placed out of doors should be plunged, standing on slates

otherwise the hot weather during the Summer months would penetrate the pots and injure the plants. These plants must not, however, be turned out of doors till they have made their growth, enabling them to set their buds for the ensuing year. Place saucers under all the pots in the greenhouse, taking care that no water is allowed to stagnate in them. Pick off yellow leaves as they appear. Cleanliness must be strictly attended to. This will obviate the necessity for too frequent fumigation, which is always more or less injurious to the plants. We have found that the constant use of the syringe is the best preventative of the green fly or red spider. Manure water may be frequently applied, but it must be weak. Cut down Pelargoniums as they go out of flower. Give Fuchsias for late blooming a liberal shift, and water with manure water. Shade plants in flower if their beauty is required to be prolonged. Newly-potted plants also require to be shaded and kept rather close for a few days, till the roots lay hold of the fresh soil. Put in cuttings of Pelargoniums. Propagate Chrysanthemums, and shift and stop established plants. After getting the final shift, stand, or far better still, plunge the pots in open, airy quarters, and take special care that they are well supplied with water. Green fly will now be troublesome in the greenhouse; the finger and thumb, aphid brush, and, above all, the syringe, must be constantly in requisition to keep this pest and the red spider in check. With the view of securing permanent shade in the greenhouse, the side facing north may now be washed with white-wash made of fresh slacked lime and milk applied with a white-wash brush. Whitening and milk or whitening and size will also answer. We have adopted this method of shading, and have found it most satisfactory. The dressing must be applied on the outside of the house. It will last till washed off by the Autumn rains.

January.—Admit air freely night and day, except during sudden changes. Water plentifully; syringe in the evening. Continue to shift, pot, and regulate the plants as necessity occurs. Graft Camellias and Azaleas. Cinerarias which have finished blooming may be cut down and planted out of doors, or kept in pots if required to be grown for suckers, or merely by thinning out, or dividing the old plants.

Apply weak manure-water to late flowering *Calceolarias*. Cut down those finished blooming ; thin the pods of those left for seed, as one pod will give hundreds of plants. Those which have finished flowering may be planted out on a border facing south. Cut down the most forward *Pelargoniums* ; tie and train successions ; prepare for an early supply of cuttings ; they will strike freely now. Choice varieties should be struck in thumb pots, they are less liable to damp off, and after they have struck can be shifted without the smallest injury to the roots. Cut down *Heaths* when done flowering ; cuttings may still be made under hand glasses ; shift those starting again, after being pruned. Shifting must be attended to with all successions, such as *Fuchsias*, *Pelargoniums*, *Balsams*, *Cockscombs*, &c. Cuttings of *Petunias* and shrubby *Calceolarias* may be put in, as directed for *Pelargoniums*. *Petunias* put in now will make excellent stock plants to strike from, for bedding-out next year. Take off decayed blooms unless where seed is required, and keep plants clear of dead leaves. *Chrysanthemums* will now require stopping, that they may throw out laterals. If dwarf specimens be an object, top cuttings may be put in.

February.—Give air night and day. *Pelargoniums* which have been cut down, and have started to grow, may now have the soil shaken from them, potted in light soil and placed in a close, moist pit to encourage free growth ; until that growth has taken place, give little water at the roots. In growing from cuttings, success will greatly depend in never allowing them to stand still, but keeping them constantly but slowly growing. Cut down successional plants as they finish blooming. If required to flower again before Winter, simply remove the old flowers and nip the points of the branches, this being more applicable to the fancy varieties. *Zonale Geraniums* for Winter flowering should be placed in an exposed sunny situation, and kept moderately dry, in order to harden their growth. All young stock, growing freely, should be hardened off by the end of the month. Potting should now be proceeded with in order that the roots may have time to establish themselves before Winter. Almost everything may now be successfully

propagated. The propagation of half-hardy plants may be commenced by the end of this month. Sow seeds of herbaceous kinds in a cool pit. Use the syringe amongst growing plants freely on warm evenings. Dress, tie, and keep all plants neat and clean. Chrysanthemums should now be particularly attended to, and if the pots be well filled with roots, be liberally supplied with manure water. A mulching of manure, too, over the surface of the soil in the pots will benefit them much.

March.—Continue to give air freely night and day in fine weather. Pot bulbs for early blooming, such as Hyacinths, Narcissus, Tulips, &c. (See instructions.) Camellias may still be exposed, but they should be sheltered from heavy rains. Cuttings may still be made, and budding proceeded with. Early sown Cinerarias may now receive their final shift for Winter blooming. Propagate Calceolarias by cuttings; shift small plants already struck; get Ericas and Azaleas under shelter, ready for housing by the end of the month. Pelargonium cuttings now rooted, may be potted off for flowering or specimen plants. Commence propagating Pelargoniums, Fuchsias, Verbenas, Ageratums, Petunias, &c.; the smallest pieces will do best (the tips of the shoots). Verbena cuttings must be carefully shaded after planting, and sprinkled freely with water; but the soil must not be kept saturated. Plants still growing freely must be abundantly supplied with water, and those intended to bloom in Winter, such as Cinerarias, Primroses, and Chrysanthemums in pots should have manure water given freely.

April.—Air must still be admitted freely during the day, but sparingly at night. Camellias and Azaleas should be housed before the end of the month, as the least frost will discolour their leaves. Continue to pot bulbs. Cinerarias should now be housed. Prick off seedling Calceolarias, and pot forward plants. Prune in climbers on rafters to admit the sun and light to the plants beneath. Keep Azaleas, Camellias, Fuchsias, etc., in the coolest part of the house. All kinds of cuttings intended for outdoor work next season must be kept secure from dampness, which is

their greatest enemy. Pelargoniums must be kept clear from the fly, by the frequent use of the syringe, and kept slowly growing. This last condition is the best antidote against the former; avoid, however, letting them be chilled and soaked, as this engenders the disease known as spot.

May.—Continue to admit air freely in fine weather. Azaleas required for blooming early should be kept in the warmest part of the house. Those required for flowering in Spring and early Summer must be kept as cool as possible. Keep Calceolarias and Cinerarias growing slowly in a moist and airy atmosphere; those intended for late blooming must be kept cool. Continue to pot off seedlings. The earliest Camellias will now be swelling their flower buds, which should be thinned if necessary. A little cow-manure water, clear and not too strong, will do them good. Water only when necessary. Keep all plants clean by washing, and fumigation when necessary. When a plant requires water, water it thoroughly, never superficially, or the consequence may be that plants with delicate, hair-like roots may have the surface of the soil apparently wet, while the ball of earth is really quite dry. Airing well on brisk, drying days is the only means that should now be resorted to in the greenhouse for the prevention of damp; but should fire heat be absolutely necessary to counteract it, have recourse to it only on brisk, dry days, when the house can be at the same time freely aired and the temperature kept up. Chrysanthemums should have plenty of room and air, and also an almost daily dose of liquid manure. Pelargoniums may now be lifted from the beds and borders, and planted three in a six-inch pot, and in boxes, and stored in the verandah if there is no room for them in the greenhouse or cold frame.

Cold Pits and Frames.—Plants in these will require constant attention, both as to giving air and preventing damp. When, during bad weather, the sashes cannot be taken off, air should be given by tilting the front of one sash and the back of the other, alternately. See that no decayed leaves are allowed to remain on Calceolarias, Pelargoniums, Verbenas, or other soft-wooded plants

wintered in frames or pits. Verbenas are very subject to mildew, and a sharp look-out for its appearance should be kept. Immediately on the first trace being observed, dust with flower of sulphur.

June and July.—Whenever the weather is mild and dry, give plenty of air, but not in a way calculated to create draughts or currents; water cautiously, but at the same time thoroughly. Fires may be lighted occasionally, but only to expel damp, and this only on fine, dry, brisk days, when, at the same time, air can be given freely. Decayed leaves and flowers should be promptly removed. Remove Chrysanthemum blooms as they decay, and the plants themselves as they go out of flower, and place them out-of-doors; encourage later blooming specimens with liquid manure, light, air, and water. Zonale Geraniums in flower should be kept well up to the light, and should be helped to occasional doses of soot-water, or other mild stimulant. Cinerarias and Chinese Primroses coming into flower should be brought forward to where they will have plenty of air and light, and have occasionally a little weak manure-water given them. Camellias in flower will require to be well supplied with water, provided the drainage is good, and the soil not sour or saturated. Clear soot-water agrees particularly well with Camellias, and forms a wholesome stimulant, provided the pots are full of roots. Pelargoniums for early blooming must have plenty of air, and a temperature not lower than 45° ; they will also require tying out. Young plants in cutting boxes in frames will require plenty of air and all the sun they can get to prevent them from damping off. All decayed leaves should be at once removed.

Tuberous-rooted Begonias. — This highly ornamental class of beautiful free-flowering plants, with their graceful pendulous and upright flowers forming an effective contrast to their glossy, marbled foliage, stand pre-eminent for conservatory or greenhouse decoration, and they are equally adapted too for out-door bedding in Summer. In habit, the plants are dwarf, compact, and very free-blooming, the individual blooms being of large size and good substance.

The colours of the flowers are very brilliant, and comprise many beautiful and rich shades of crimson, scarlet, orange yellow, pink and rose.

Propagation by Seed.—The best time for sowing is about the middle of September. It is necessary to use more than ordinary care when sowing the seed, so that it is not buried too deep. Care must also be taken that good drainage is secured, by putting two inches of broken pots in the bottom of the pots or pans; on this place a little rough-sifted mould or moss, filling up with compost composed of two-thirds good loam, one-third peat, and sharp sand, and a little well decomposed cow manure. Fill the pots to within an inch of the top, make the surface as smooth as possible by lightly pressing it with some smooth substance, water gently with a fine-rosed watering-pot before sowing the seed, then distribute the seed evenly, and cover with a mere sprinkling of sand; press gently with a bit of glass or board. Cover with squares of glass and place the pots in the greenhouse or in a frame or propagating box, shading from the sun during the heat of the day. When the plants have made two or three rough leaves they may be pricked off into boxes or pans and kept close for a few days; in about a month they will be fit to pot off into three-inch pots, using the same compost as first recommended. Shift again as soon as the roots have reached the edge of the pots, into five or six-inch pots, which will be large enough to bloom them in the first season. When the plants have done blooming they may be dried off gradually, and the pots placed under the stage on their edges. They must be kept dry. In the following Spring, if desired, the tubers may be repotted for indoor blooming or planted out in borders, where they will make a grand display during the Summer months, and in the Autumn they may be treated in the same manner as Dahlias, or the tubers may be left in the ground all Winter, care being taken to mark with a stick or label where each plant grew, so that they may not be disturbed when digging the borders in Spring.

Begonias (double varieties)—

Duchess of Teck, golden yellow.

Fair Imogene, rosy pink.

Lady Mary Fitzwilliam, pink blush.
Louis d'Or, bright yellow.
Madame Commesse, deep salmon.
Marquis of Stafford, deep crimson.
Mrs. French, creamy white.
Prince of Wales, crimson scarlet.

Single Begonias—

Albert George, fiery terra cotta.
Avalanche, pure white.
Duchess of Edinburgh, deep salmon.
Princess Louise, white.

Night Flowering Cacti.—These peculiar and lovely floral wonders are rarely met with outside botanical gardens ; and yet there is no reason why they should not occupy a place in every glass house where heat is used. They require a dry atmosphere, so that they are not suited to orchid houses. They need little attention. The blooms commence to unfold their beauty at sunset, and are fully open by 8 or 9 p.m., commencing to fade away by sunrise. The finest varieties of these nocturnal beauties are *Cereus Grandiflorus*, *Cereus Nycticalus*, and *Cereus McDonaldia*, all of which have climbing or creeping stems. The two former bear blooms of ivory whiteness quite ten inches across—and deliciously fragrant. The blooms of the latter are tinged with orange red. They are as easy of cultivation as other plants of the same tribe usually are. Messrs Adams & Son had some magnificent blooms on a plant of *Cereus Grandiflorus* grown by them, which we had the good fortune to see. It was beautiful beyond description. We felt filled with regret that such glory could only last till the dawn of the following morning.

Auriculas, Polyanthus, Primroses, and American Cowslips, etc., etc., which have been potted for early blooming in the greenhouse, must not be allowed to suffer for want of water. Care must, however, be taken not to allow the water to stagnate about their roots. Auriculas are particularly impatient of too much moisture. The green fly will probably be troublesome, when fumigation will be

necessary. We have, however, found that keeping the foliage of *Primulas* constantly damp is a good preventative against the pest.

Greenhouse—Manuring Pot Plants.—To grow greenhouse plants successfully the first consideration must be a good compost heap. This must always be at hand. The following compound will be found suitable for the great majority of plants grown in pots for greenhouse purposes:—To every three barrow loads of sods from an old pasture add one of well rotted old hot-bed manure or cow-dung and one of peat; build this in alternate layers, adding a few handfuls of rough crushed bones, say half a pound to each barrow load of stuff, and a couple of shovelfuls of wood ashes. This mixture should remain exposed to the atmosphere in the heap at least 12 months, being frequently turned during that period, before using for potting purposes. If sods cannot be had then the best of the garden soil must be selected for the purpose, a few barrow loads of road scrapings will form a valuable adjunct. Finally, the heap of stuff should be thoroughly broken down and placed under cover, ready for use at all times when required for potting. Leaf-mould formed from the leaves of deciduous trees is a valuable addition to compost required for pot plants, but it must be thoroughly decomposed, otherwise it should be avoided.

Compost for Potting.—It is a good practice to sift the compost, passing it through a half-inch mesh riddle, using the screenings for placing over the drainage in the pots, say half an inch thick. This compost will be found suitable for such plants as *Fuchsias*, *Camellias*, *Pelargoniums*, *Primulas*, *Cinerarias*, and many others. To every barrow full of compost add one good shovel full of sharp sand, and mix thoroughly. On top of the drainage in the pots I drop a large pinch of rough bone dust, keeping a good look out for wire worms, which frequently infest compost heaps. It must not, however, be supposed that the compost just referred to will be found equally suitable for all classes of plants.

Soils for Rhododendrons, etc.—Heaths, *Rhododendrons*, *Azaleas*, and a large variety of American plants will thrive

better in soil with less manure and more peat, which latter must, however, be fibrous and thoroughly aerated. Soils of a calcareous nature are totally unsuited to these plants; in fact lime is an abomination to them. Then there are plants which require special treatment, such as Balsams and Cockscombs which thrive best in a light friable soil, 50 per cent. of which is well decomposed manure. Either of the above composts, however, will answer with frequent applications of liquid manure, which should play an important part in successful pot culture.

Liquid Manure is particularly adapted for those plants which require stimulating during the period of their growth, such as Fuchsias, Pelargoniums, Cinerarias, Chrysanthemums, Begonias, etc., because it contains the principal fertilising ingredients in a soluble state, ready to be at once taken up by the spongioles of the roots. Care must, however, be exercised in its use, for if applied too strong or too frequently it will do more harm than good. The following directions may with safety be followed:—Take one bushel of sifted horse droppings, place it in a tub or old cask, pour over it about twelve gallons of water, stir well and allow it to stand for a couple of days. The clear liquid may then be applied to pot plants twice a week. To every gallon of water add two ounces of superphosphate or half an ounce of Peruvian guano, stir well and use at once—once a week—or take, say, 10 lbs. of poultry or pigeon manure, and pour over it five gallons of water, stir well—use once a week. A very useful liquid manure may be made by collecting a barrow load of cow or sheep droppings, place it in an old cask or tank, pour over it as much water as will reduce the whole mass to a liquid state sufficiently thin to run freely through the spout of a watering-pot; keep adding water as used to the cask till the liquid becomes almost colourless. One pound of soot to the gallon of water well mixed is a good liquid dressing, used once a week.

Lime Water is an excellent application for getting rid of worms, when they abound in flower-pots. I use the word abound, for it is just a question whether one or two in

a pot are not of service, considering their mechanical action on soils.

Worms.—Those who have not yet read Mr. Darwin's exposition of the Action of Worms on Soils will do well to consult his chapters on that subject. The matter is one of great interest, placing worms in the exalted position of benefactors in the economy of nature ; in fact, they are our best natural soil fertilisers. But to return to lime water. To every pound of fresh unslaked lime add one gallon of water, stir well, then allow it to stand till quite clear. Take the infested pot, turn it up, plug the bottom hole with a cork or potato, then saturate with the clean lime water and allow it to stand for half an hour, then draw the plug when the liquid will drain off, in the meantime the worms will come to the surface and may be removed. Lest the lime water should be thought too strong for the roots of the plants, the pots may be drenched with clear plain water.





ORCHIDS.



SINCE it has been discovered that some Orchids can be grown in cool greenhouses in this favoured clime with the greatest ease, a demand has arisen for this beautiful class of plants. A few degrees of frost do not seem to injure them, as they have been successfully grown in a fernery from which frost was not excluded. In the following remarks only those kinds which are called coolhouse Orchids will be referred to, and which are known to succeed in a greenhouse without any extra amount of care or which require the skilful treatment of a professional gardener.

Orchids are grown in baskets suspended from the roof, in imitation of their natural condition as parasites on trees, but they can be equally well grown in pots on the stages. The latter system is to be recommended for the amateur who may not be able to give frequent attention to the plants, as treated in that way they do not dry up so quickly. When

grown in pots there should be a shallow pan fixed under the stages to contain water, which will supply the necessary moisture by evaporation. When grown in baskets suspended from the roof the plants must be plunged in water for a few seconds every day during the Summer months, but in Winter once a fortnight will suffice to keep them in the necessary condition of moisture, the water being previously warmed. Shade is essential during the Summer and Autumn.

The materials for growing Orchids are good sweet fibrous peat in lumps, charcoal, broken brick, and sphagnum moss.

To Basket an Orchid.—Place a layer of sphagnum on the bottom of the basket, then fill up with pieces of peat, brick, and charcoal in equal proportions until the basket is heaped up in the centre. Then place one or two stout stakes in the compost, put the base of the plant in the centre, spreading out the roots on the surface, and tie the principal shoots to the stakes to keep the Orchids in position. Cover the whole with sphagnum and the work is done. Some species, such as *Phajus* and *Disa*, are terrestrial Orchids, and should be grown in pots in a compost of loam, leaf mould, and rotten manure, well mixed together. Two inches of drainage should be put at the bottom of the pot, then a layer of moss, or rough peat, filling up with the compost so that the base of the plant is about level with the rim.

The following list includes both epiphytal and terrestrial species :—

Cypripedium, or Ladies' Slipper Orchids.—There are about a dozen sorts, which can be grown in a frame or cool house.

Disa Grandiflora and its Varieties.—These are best grown in shallow pans in fibrous peat, sharp sand, and sphagnum moss. Water freely when growing, as the plant grows in boggy places on Table Mountain.

Dendrobium, *Speciosum*, and *Nobile*.—These Orchids are very hardy and free growers. They will succeed either in pots or in baskets.

Goodyera Pubescens.—This is a beautiful foliage plant, suitable for a cold frame. It should never be allowed to get dry at the roots.

Lycaste Skinneri.—This species is easy to grow, and its blooms are both beautiful and durable.

Orchis Foliosa.—This is a fine terrestrial species from Madeira, and makes a good exhibition plant when well grown.

Satyrium.—A very interesting genus of Orchids from the Cape, which succeed well in a cold frame in the compost given above.

Odontoglossum.—There are many species in this large genus which can be successfully grown in a cool house in which the temperature ranges from 45° to 55° in Autumn and Winter. They come from the South American Andes. Some are best grown in baskets, but most of the species do well in pots.

Oncidium.—A few of these decorative Orchids will thrive in a cool house, and, as they are good growers, they may be recommended for cultivation by the amateur.

Phajus.—This is a handsome, strong-growing class of Orchids of easy culture. They require warmth in the growing season in Spring, but when at rest in the Winter months they do well in a cool house if kept dry.





NEW ZEALAND PLANTS.



THE following list of plants suitable for borders, specimens, hedge plants, and rock-work, has been furnished by Messrs. Adams & Sons, Christchurch, who have made a speciality of this department of horticulture.

Few persons, except those who have visited the Alpine regions of New Zealand, have any idea of the beauty of the flora. It is therefore a matter for congratulation that the above-named firm have commenced making a collection of those little-known but lovely Alpine plants and shrubs, many of which could be grown with ease in our gardens, thereby adding greatly to their beauty. The following are a few of those which have been tested and have been found to thrive on the low lands :—

Aciphylla Colensoi and *Lyalli*, the bayonet plant, flowers white.

Acæna adscendens, and *microphylla*, suitable for rock-work.

Astelia Nervosa, Bush Flax, resembling a *Yucca*, a good ornamental plant.

Carmichælia nana, a pretty dwarf flowering plant, suitable for edgings.

Cassinia fulgida, ornamental flowering shrub.

Celmisias: these are all fine foliage plants and easy of culture.

Clematis indivisa, and *hexasepala*, evergreen climbers, white flowers.

Coprosma acerosa, a dwarf shrub, bearing blue berries.

Coprosma lucida, dwarf, with beautiful red berries.

Cordyline australis, and *indivisa*, the Cabbage Palms.

Corokia cotoneaster, a small shrub with orange berries.

Fagus cliffortioides, the Mountain Beech.

Forstera sedifolia, a lovely little plant with pure white flowers.

Gaultheria Antipoda, the Snowberry, dwarf shrub with white berries.

Gaultheria rupestris, flowers like the *Arbutus*.

Gentiana pleurogynoides, the Mountain Gentian.

Gentiana saxosa, Mountain Snowdrop, free flowering herbaceous plant.

Gnaphalium bellidioides, the Mountain Daisy.

Gnaphalium grandiceps, the New Zealand Edelweiss.

Hoheria angustifolia, the Lacewood, ornamental flowering tree.

Ligusticum Haastii, a handsome, herbaceous, foliage plant.

Metrosideros lucida, the Rata, handsome evergreen shrub, with brilliant crimson flowers.

Olearia avicennæfolia, *dentata*, *ilicifolia*, and *Colensoi*, all tall-growing shrubs and free bloomers, suitable for hedge plants or shelter.

Ourisia macrophylla, a fine bloomer, with dwarf habit.

Ourisia macrocarpa, a fine foliage plant with splendid spikes of white blossoms.

Panax Colensoi, a beautiful berry-bearing shrub, suitable for hedges and shelter.

Pittosporum eugeniioides, free growing evergreen shrub, good hedge plant.

Plagianthus betulinus and *Lyalli*, Alpine trees, beautiful in flower and foliage.

Panax longissimum, the Lancewood.

Ranunculus Lyalli, Mountain Lily, large white flowers and very handsome foliage.

Raoulia glabra and *subcericea*, handsome carpet plants, with lovely white flowers. These plants will probably be useful for lawns instead of grass.

Raoulia grandiflora, a fine rock plant.

Senecio bellidiodes, a herbaceous plant with yellow flowers.

Senecio Bidwillii, a shrub with fine wax-like foliage.

Senecio elæagnifolius, a shrub with bright green foliage.

Senecio laxifolia, a dwarf flowering shrub, free grower.

Sophora or *Edwardsia grandiflora*, New Zealand Laburnum.

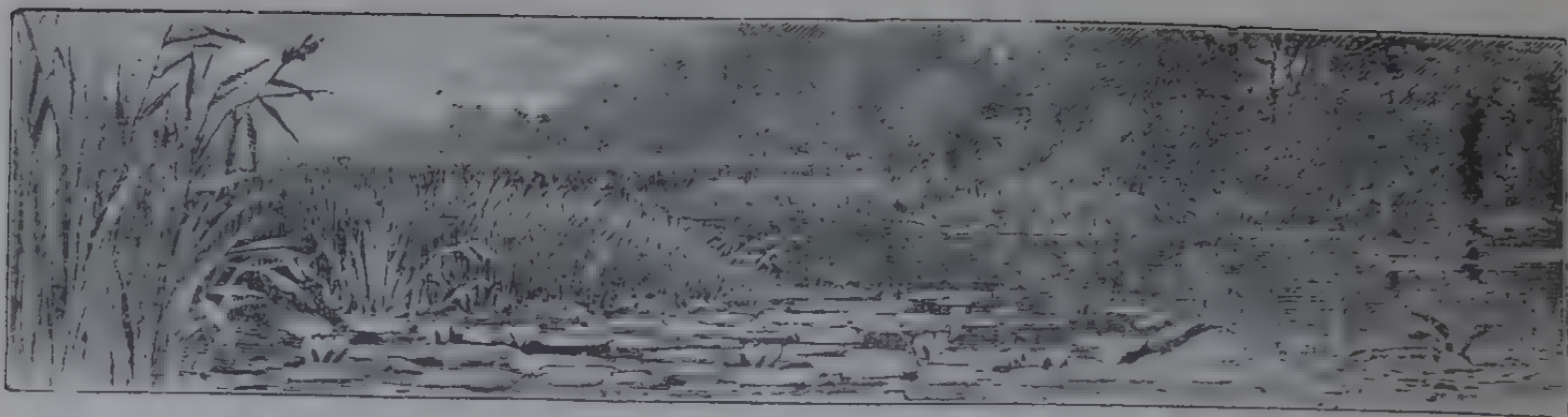
Veronica Bidwillii, *Lyalli*, *linifolia*, *Lavaudiana* and *pungifolia*. These are all dwarf of habit, and are suitable for growing on rock-work.

The lowland plants in the above list are easy to grow in any garden soil, and when once established their growth is rapid. The Cabbage Palm is easily raised from the seed, and plants eight feet high can be grown in as many years. A fine specimen in the Victoria Nursery, Christchurch, a foot through in the stem and carrying eight heads, which have broken again into sixteen crowns, has been grown from seed in ten years. The tree is fifteen feet high, and the head measures twenty-four feet in circumference. An avenue of these *Dracoenas* planted twelve feet apart in deeply-trenched soil would have a fine tropical appearance. With the exception of the *Pittosporum*, very few of the native trees and shrubs have been cultivated, but there are few finer things for the background of a shrubbery than the New Zealand Laburnum when covered with its large golden flowers. The alpine trees *Plagianthus betulinus* and *Lyalli* both do well on the plains, and being deciduous, if they were largely used, they would add a new character to our landscape in the Autumn. They grow rapidly in strong loams, and their clusters of white flowers, like cherry blossoms, are very charming. The very distinct character of *Panax longissimum* renders it a suitable plant for gardens, and never fails to attract the eye from its singular mode of growth. The *Olearias* are all worth growing, being ever-green and free in bloom. *Olearia Haastii* is very fragrant, whilst *Olearia ilicifolia*, the New Zealand Holly, is a very

desirable shrub. Of the climbing plants we have several species of Clematis ; the Parsonsia and the Calystegia, an evergreen convolvulus, which are worth a place in every garden.

The alpine plants are more difficult to grow, but it has been proved that when a suitable place is chosen for them that they soon establish themselves. These gems from the mountain, if shaded from the sun and sheltered from hot winds, grow freely among stones in a peaty soil. Those who wish to grow the fine Ranunculus Lyalli, Celmisias, Aciphyuas, and other alpine plants should make a rockery in a shady place ; and if a small fountain could be arranged in the centre to keep the plants moist in hot weather, success would be certain. Small patches of the Raoulia, Pratius, and Wahlenbergias, which can be easily collected in the river-beds, would soon cover the rockwork and help to keep the ground in that cool condition which all alpine plants love. In a rockwork of this description the spear grasses are at home, and the Celmisias soon grow into large specimens, which never fail to throw up their bold, aster-like bloom. In short, a collection of alpines is a never-ending source of interest ; and looking forward to the time when the railway will pass through the heart of the ranges, the collection of the plants will be a great source of pleasure and relaxation.





THE FERNERY.



THE First Napoleon said that the drum was the only instrument which was never out of tune. In like manner it may be said that Ferns are the only plants which are never out of season

The fernery, whether under cover or out of doors, is usually the favourite spot in the flower garden or pleasure grounds.

To retire from the full glare of noon and the dazzling beauty of the flower garden, into the cool retirement of the fernery, situated as it should be in some secluded spot, affords a most refreshing change to both body and mind. The beautiful forms and varied shades of green which the fern tribe present, render them objects of perpetual beauty. To correspond both with the requirements of ferns generally, and that situation which the mind associates with these denizens of shade and rock, the fernery should occupy some quiet and shady, and if possible, romantic retreat. When the ground presents none of these features they may to some extent be created by mounds of earth and excavations with roots of trees, rocks, and old bricks and slags tastefully arranged. Shade and moisture must however be provided by planting trees,

such as cupressus, macrocarpa on the outside, or a few weeping willows and a profusion of tree ferns ; with these materials a natural looking fernery may soon be formed. Failing these, ferns may be successfully grown along a south wall or fence. The most successful fern growers are those who copy as nearly as possible the natural habit of each fern in their collection. It is not reasonable to suppose that the little stunted fern which grows in the crevices of rocks, exposed to the sun, and every blast of wind will thrive when subjected to the treatment necessary for the denizens of damp and shady forests.

The secret of successful fern growing under cover is to protect them from the wind and sun. This may be done by placing them in an enclosure covered in with thin canvas or scrim (such as paper-hangers use), stretched over a frame work ; or in a lean-to placed against a wall or fence with a south aspect. Most ferns will thrive if planted in peaty soil, or decomposed nigger-head roots mixed with a little sharp sand, bits of charcoal, and broken pots, and kept moist ; but the drainage must be good. An artificial rockery may be formed by excavating the soil in the enclosure, and banking it up on each side of the walk. Rocks, or even clinkers from the brick kiln, will answer for forming the rockery, leaving sufficient space between them for planting the ferns ; the stems of fern trees should be largely used when procurable. Wood of any sort must, however, be avoided, as it harbours woodlice, and promotes fungoid growth, which will soon destroy the ferns if not eradicated. Otherwise, the old roots of trees could be used with great advantage in building the rockery. Roots may be used out of doors. Most ferns require constant moisture at their roots, which must not, however, be stagnant, and a moist atmosphere, particularly in Summer, when they should be syringed morning and evening.

Growing Ferns in Pots.—Where large collections of ferns are kept, it will be better to grow some of them in pots, as the same kind of soil will not suit all ferns. Such ferns as are found in moist, shady forests, require a mixture of peat mould and rotten leaves. Those that grow on

mountains will thrive in gravelly loam, while those that flourish in peat bogs require peaty soil, and such as are natives of heaths, or crevices of rocks, do best if planted in sandy, fibrous mould. With these different soils most kinds of ferns may be successfully cultivated. The pots should be filled one-third with drainage, composed of broken pots and lumps of charcoal. A little of these materials broken rather finely and mixed with the soil will be an improvement. The pots should be plunged in tan, coal ashes, or sawdust, for the purpose of keeping the soil in the pots uniformly moist and cool. A glass house built against a wall, and facing south, will answer best for growing ferns in pots. The glass should be painted green or whitewashed with lime and size, or lime wet with skim milk. There must also be ample means for ventilation, which must be constant Winter and Summer. Glass will be found cheaper in the long run than scrim, and much more satisfactory.

Raising Ferns from Seed (or Spores).—Large numbers of ferns may be raised from seed by adopting the following method :—Take peat soil one part, sharp sand one part, loamy soil one part, and one part of finely broken potsherds (broken pots) and charcoal, well mixed together. Take boxes, pans, or pots, fill one-third with roughly broken potsherds, filling the remainder with the mixture to within an inch of the top. Before, however making the compost, it is a good plan to partially roast the soil and peat in an oven or over the fire, this will effectually destroy any seeds of weeds, and all insects or germs of life of any kind ; this plan is strongly recommended. Having filled the pot or box, water with a fine rose watering pot, saturating the soil thoroughly, after which let them stand for a few hours, then take the spores and dust them thinly over the surface : they will not require any covering of soil. Cover the pot or box with sheets of glass, and place in a cool shady place, for at least a fortnight, be particular to place the pots or boxes on boards or slates, or on a thick coat of coal ashes to prevent the entry of worms into the pots which would destroy the young plants. Be careful not to let the surface get too dry ; the best way to administer water will be by placing the pots in a shallow vessel filled with water, but not

more than will reach about half way up the pot. Let them stand in the water for a few hours, when the whole surface will be moistened by capillary attraction ; once a fortnight or three weeks will be often enough to repeat the moistening. The young plants should begin to appear in about two months (although some slow-growing ferns take a much longer time to germinate), and in another month they will have developed their perfect fronds when the young plants will be ready for transplanting. The glass may be removed from the pots as soon as the young plants have for the most part sent up one or two regular fronds.

Procuring Fern Spores.—In selecting spores for sowing, the aid of a pocket microscope is necessary to see that the seed vessels have not all opened, in which case the spores will have escaped. The spore cases should be plump, and brown in colour, portions of the frond secured in this condition and folded in paper till required for sowing, will be in the best possible condition for sowing for reproduction. The seed of ferns called “spores,” are produced on the back of the leaves. The regular rows of brown spots are what are called the spore cases. The seed is encased in these spore cases, and is so small that individually they are not perceptible to the naked eye.

Filmy Ferns.—These exquisitely beautiful plants are considered by many persons difficult to cultivate. An impression that no doubt originates in the failure to grow them in a warm, dry atmosphere ; but they are just as easy to manage as the generality of other ferns, when treated in accordance with their requirements. Exposure of the delicate pellucid fronds to the sun or dry air is certain destruction. Those who wish to grow these delicate ferns should devote a special house to them. The house must be entirely shaded from the sun, and, above all, protected from hot winds. The walls may be of brick, concrete, or wood—the two former are best—and the roof must be glass painted green ; canvas covering does not answer so well. A humid, still atmosphere is requisite. If these conditions are not regularly maintained, failure will follow. As we have just said, a house must be set apart for these gems of the fern world. *Trichomanes* and *Todeas* will also thrive best under the same conditions.

Many of the filmy ferns will grow best on decomposing rocks, or on the stems of tree ferns, while others delight to grow in a mixture of fibrous peat and sphagnum moss. There are about fifteen species of filmy ferns in New Zealand. *Hymenophyllum*, *Dilatatum*, *Pulcherrimum*, and *Scabrum*, with their delicate, transparent fronds, from twelve to eighteen inches long, are, perhaps, the finest of the genus; while *Hymenophyllum Armstrongii* is the smallest. Any of the filmy ferns will grow and thrive in pots, under bell glasses, or anywhere so long as the sun or dry parching winds are not allowed to reach them. In many parts of our New Zealand forests these beautiful ferns carpet the ground, and clothe the stems of trees, particularly those which are prostrate and half decayed. The curious Kidney fern (*Tricomanes Reniforme*) is to be found growing profusely in such localities.

Potting.—Ferns, like other plants, require to be re-potted occasionally. The best time to do this will be in August, before new fronds make their appearance. Moisture must be regularly supplied, but water must not be allowed to stagnate about the roots. A mistake often made by growers of ferns is keeping them in too high a temperature. New Zealand ferns, for the most part, simply require shade and moisture. Ferns grown in a warm, dry atmosphere soon fall victims to thrip and scale. Collectors of ferns should carefully note the conditions surrounding ferns found growing in their native haunts, and endeavour, as nearly as possible, to imitate nature, as to aspect, soil, shade, or otherwise. Those who do so will be the most successful growers. The following New Zealand ferns can be easily grown in pots, boxes or baskets, provided they are kept moderately moist and not exposed to the full glare of the sun and harsh winds:—*Davalia*, *Novæ Zælandiæ*, *Adiantum affine* (Maidenhair), *Adiantum hispidulum*, *Pteris macilentum*, *Pteris incisa*, *Asplenium lucidum*, *Asplenium flabellifolium* (for hanging baskets), *Asplenium falcatum*, *Asplenium bulbiferum* (the commonest of all our native ferns, and the most suitable as well as the most beautiful for pot culture).

Insects injurious to Ferns.—Ferns are subject to the attacks of thrip, green fly, and brown scale, slugs and

woodlice. In warm dry atmospheres the thrip will be found the most troublesome, and if not destroyed they soon make havoc with the young fronds. (For description see chapter on injurious insects.)

Fumigation.—The easiest and most certain method of destroying thrip is by fumigation with tobacco; tobacco paper, if strong, will answer as well. Fumigation will also rid the house of green fly. Scale is not so easily got rid of. It attacks the back of the fronds and in the midribs. The only certain method of getting rid of this pest is by carefully washing them off with a sponge or soft brush. Great care must be used in this operation to avoid injuring the fronds. Some of the infested fronds may be cut away; but only a few of the fronds can be removed with safety at one time, however infested they may be. The best time to fumigate will be in the evening. It is safer to smoke the house a little at a time and to repeat it often—say, twice a week, when necessary. Thrip and green fly will only be troublesome where ferns are grown under glass, and where watering and syringing is not regularly attended to during the hot weather. An occasional syringing with Gishurst's compound, 1 oz. to 2 gallons of water, will also be of service. They must, however, be syringed next morning with clean water.

Woodlice and Slugs.—Where woodlice abound, they may be kept under by trapping them in the following manner:—Place a few small flower-pots about the house inverted, stuffed half full of dry moss. Large quantities may be caught in this way, as they resort to these hiding places during the daytime. They may also be caught by candlelight, by seeking for them quietly—the least noise causes them to drop off the fronds where they have just been feeding. A few slices of carrots, or potatoes, or half-withered cabbage leaves placed amongst the pots will attract slugs, where they can be gathered every morning and destroyed.



ORANGE CULTURE.



THE successful growing of oranges on a large scale in many parts of New Zealand is a problem yet to be solved. There is one point, however, which admits of no difference of opinion; and that is, that oranges will only thrive on certain classes of soil, the most suitable of all being the deep volcanic land with a dry subsoil. This latter feature is *indispensable*. A light sandy loam will also answer. The least suitable soils are the heavy clays. That oranges will thrive in New Zealand when planted in suitable localities and well sheltered is proved by the results achieved in some parts of the North Island. For instance, there is a tree at the Bay of Islands Road, Whangarei, which yields from one hundred and fifty to two hundred dozen of fruit annually; and at Waimate and Wanganui as much as seven pounds worth of fruit is frequently gathered from trees twenty years old.

Propagation. — Grafting and budding are the usual methods adopted; although many experienced orange growers in Australia prefer raising their trees from the pip, asserting that they are less liable to the attacks of blight, although they take much longer in coming to maturity. A grafted tree will be in good bearing in about ten years,

continuing to increase each year. The method of grafting is that known as cleft grafting. This operation should be performed in September. Orange pips should be sown in July.

Planting.—About 70 trees per acre is the best number to plant; and it is estimated that one man can attend to ten acres, or, if on hilly land, five acres. Trees ten years old at Parramatta, in New South Wales, are said to yield at least one hundred dozen oranges, the usual wholesale price being 6d. per dozen or £2 10s. per tree, showing a return of £175 per acre; the only expense being a little well-rotted manure and one man's time attending to them, although some authorities discountenance the use of manure of any kind.

Diseases.—The most fertile of all causes of disease is a cold, wet subsoil. Hundreds of acres of trees have been lost in Australia from this cause, and it will be well to remember that it is only throwing away money to plant orange trees on land having a retentive subsoil.

Scales.—The kinds which infest orange trees most in New Zealand are the black scale, *Lecanium oleæ*, and *Hesperidum*. The latter is more injurious than the former. The best remedy for these pests is that adopted by the best orange growers in New South Wales, viz., to brush the infected trees with a hard brush or piece of sacking, and then wash well with Gishurst's compound, which has a beneficial effect on the bark of the trees. *Icerya Purchasi*—or cotton cushion scale—is without doubt the most destructive of all the pests which infest orange or lemon groves; nor are its ravages confined to these trees; it is said to be omnivorous. Every effort should be made to get rid of this terrible pest, failing which the infected trees should be cut down and burned.

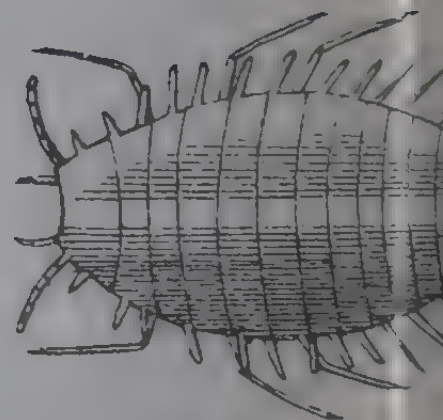
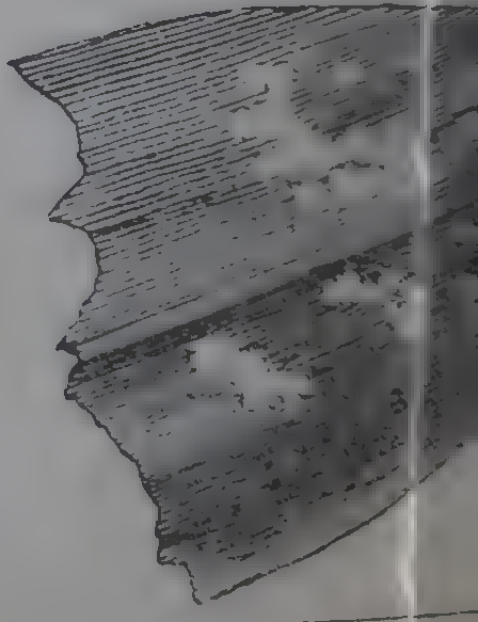
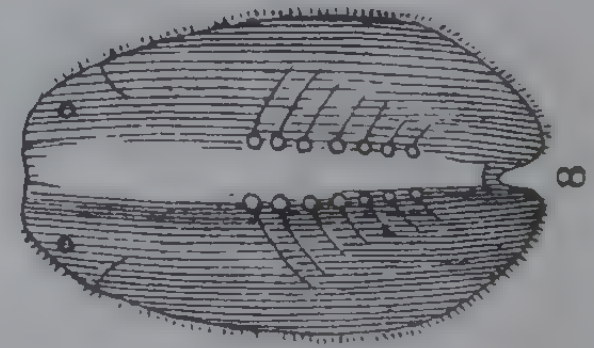
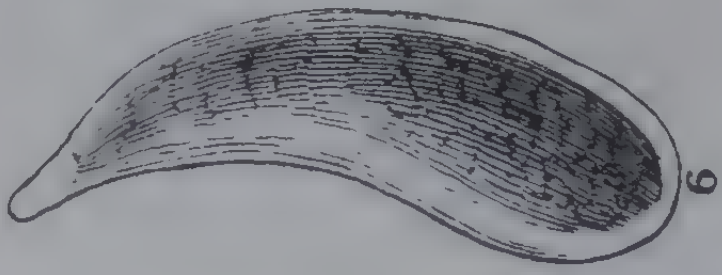
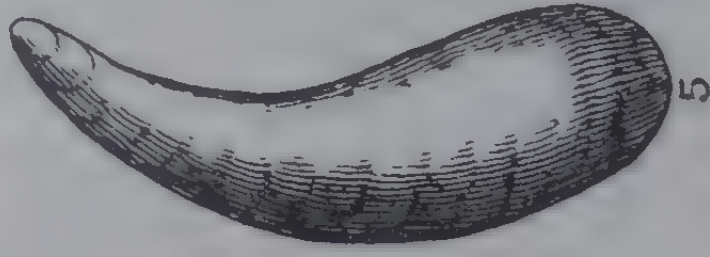
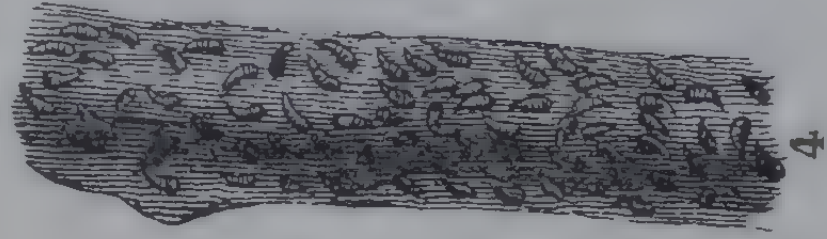
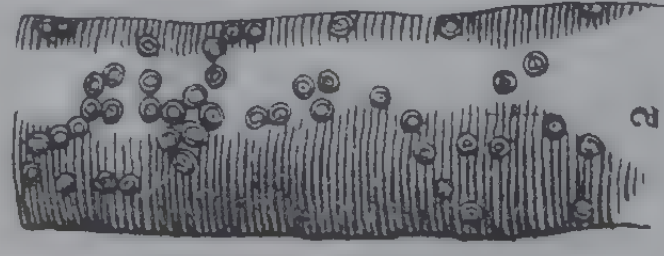
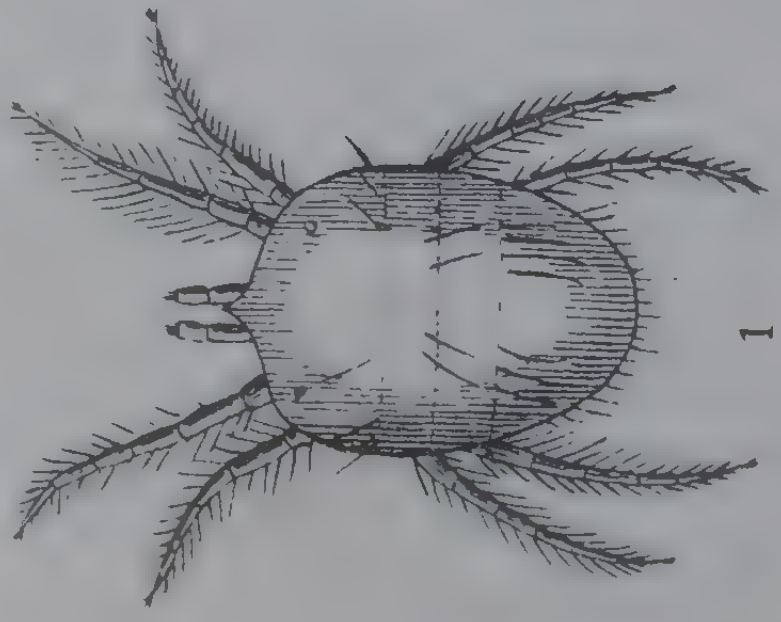
Borers are also destructive to orange and lemon trees. As soon as the holes are observed, the twig or branch should either be cut out or the holes should be probed with a bit of pliant wire or whalebone, salad oil syringed into the holes, and the holes plugged with wax.

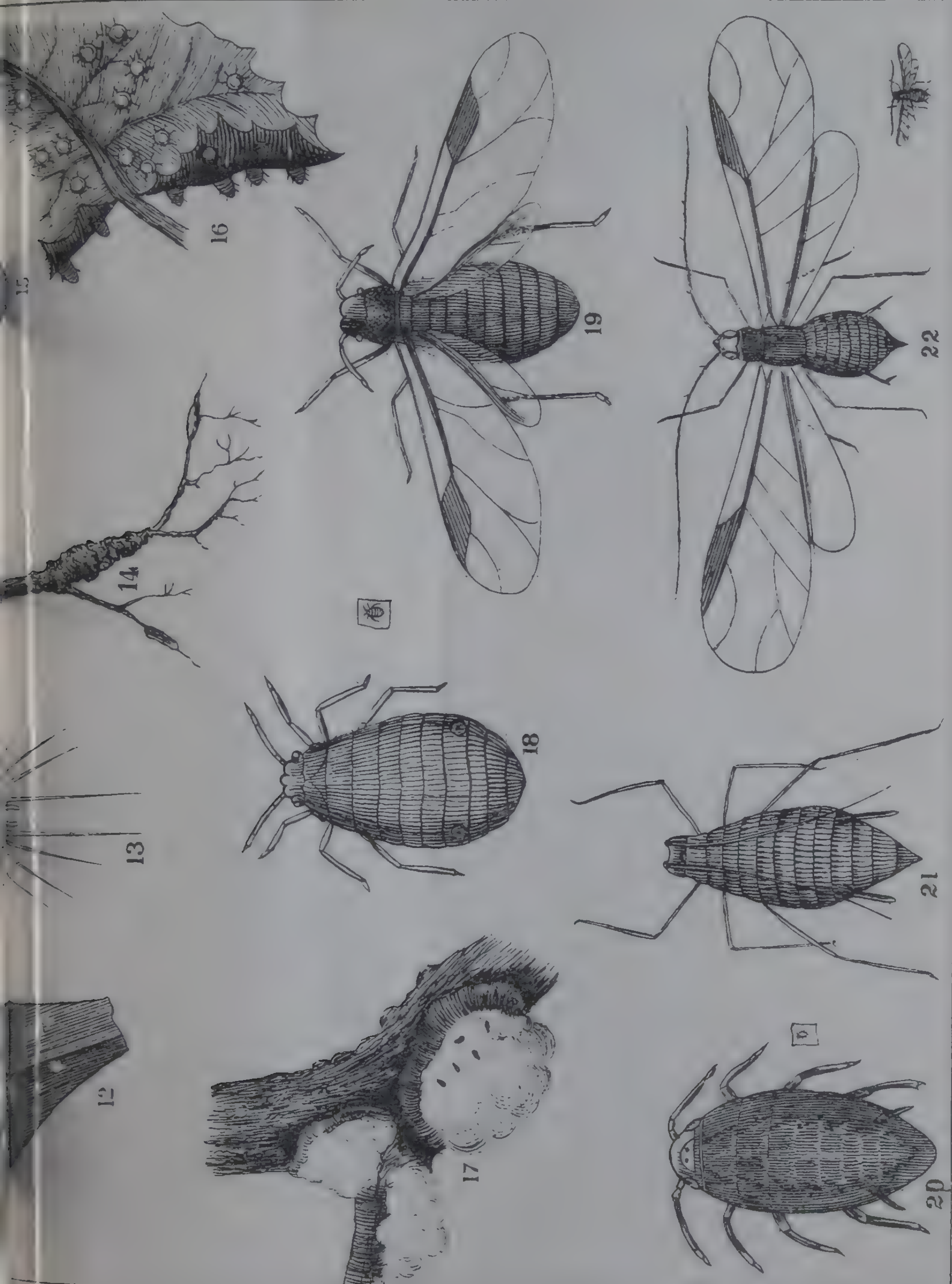
The Varieties to Plant.—This is a difficult point to settle. The best and most prolific oranges in Parramatta (New South Wales) are now known as Parramatta oranges.

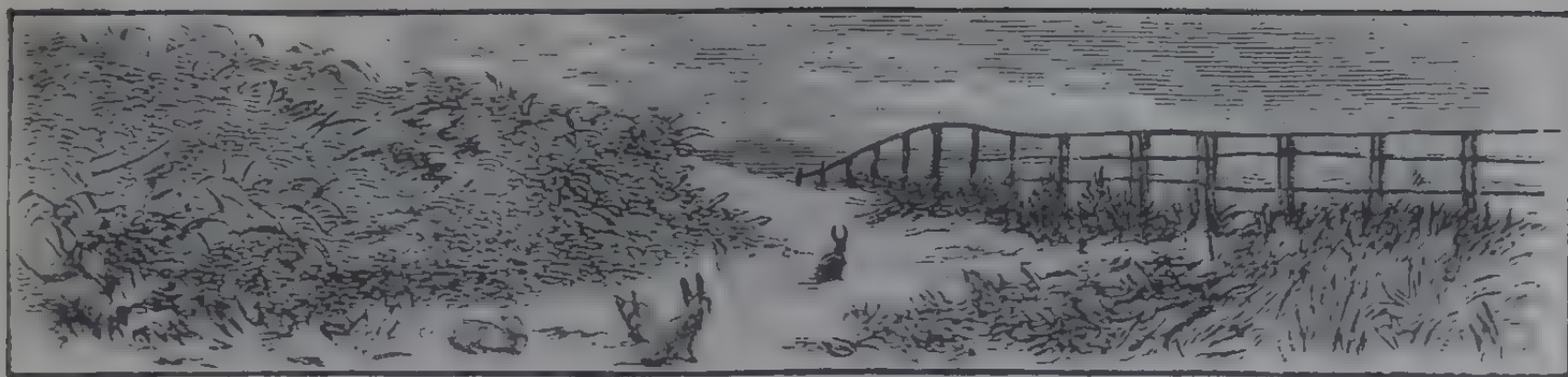
For fuller information on this subject we would direct out readers' attention to a treatise on Orange Culture, by George E. Alderton, published by the New Zealand Government, 1884, and which may probably be had on application to the Agricultural Department, Wellington.



Plate 2.

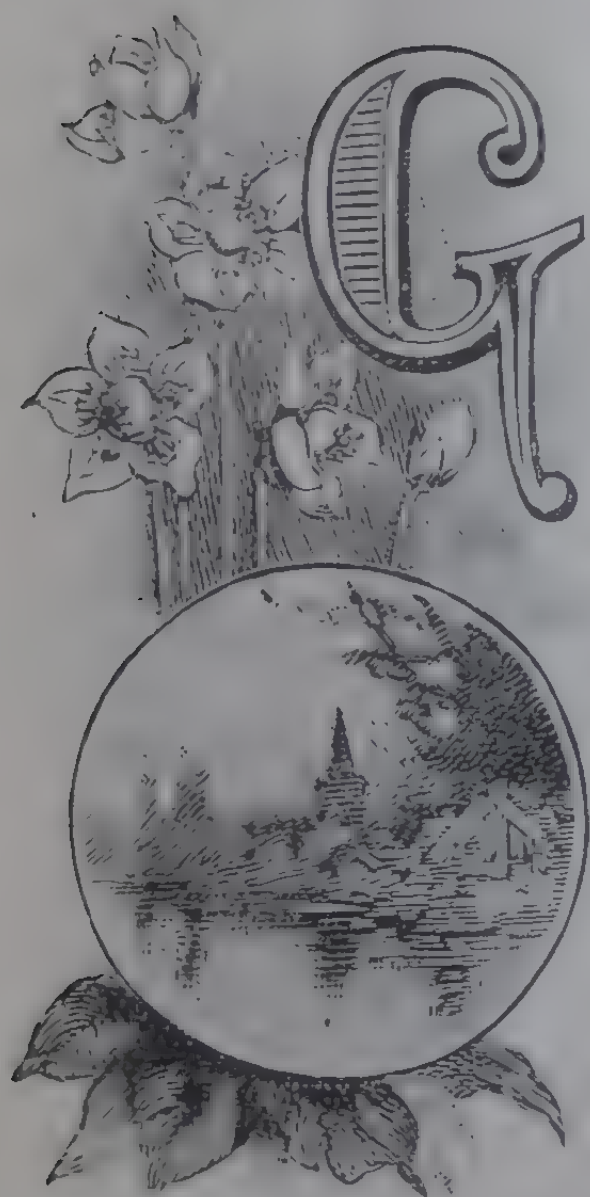






INSECT PESTS & DISEASES OF PLANTS.

(See Plates Nos. 2 and 3 with Reference attached.)



GARDENING can afford but little enjoyment or profit unless good cultivation and cleanliness form its chief characteristics. Plants covered with green fly, mealy bug, or red spider are too frequently seen in neglected gardens; what possible enjoyment can such wretched gardening afford? Amateurs as well as experienced horticulturalists should make themselves familiar with the life history of the numerous creatures which infest their trees, flowers, and vegetables. When this knowledge is attained, the fruit and flower grower can go to work

intelligently to exterminate their insect enemies.

All garden plants are subject more or less to the attacks of insects of some kind or other. The best means at our

disposal for the prevention of their attacks is to keep the plants in a vigorous state of health ; this will not, however, always succeed. It is therefore necessary that other means should be taken whereby they may be kept in check.

Aphides, commonly called Green Fly or Plant Lice, are amongst the greatest enemies of the vegetable world, upwards of 300 species have been described—the powers of multiplication possessed by these little insects is almost incredible. Professor Huxley calculates that a single Aphis, in five generations, may be the progenitor of nearly six millions of descendants. It will therefore be seen that unless constant war is waged against these tiny foes, they would soon destroy every plant they attack. Fortunately they are easily destroyed. Plants growing in houses if attacked, as they frequently are, by green fly may be cleared of them by an application of Gishurst's compound, one ounce to each gallon of water. The liquid should be applied with a syringe. Fumigation with tobacco leaf or tobacco paper is also a certain remedy. The plants should be well syringed the following morning.

Tetranychus Telarius, or Red Mite, commonly called Red Spider. This pest has become almost universal of late years in the garden and hothouse. It attacks vines, apples, pears, plums, cucumbers, and melons. It frequently destroys whole hop gardens. Fruit trees badly infested—the foliage and branches appear as though they were covered with iron rust. These signs denote the presence of myriads of these pests. The red colour is said to be caused by the myriads of ova covering the surface of the bark. The creature attacks the under surface of the leaves of all plants, and can only be plainly seen by the aid of a glass.

Pear Slug (*Selandria Cerasi*).—This pest is now common in most parts of New Zealand. It attacks not only pears, but cherries and plums, and white thorn, preventing their healthy growth by destroying the leaves (or the lungs of the tree) before the tree has had time to mature the year's growth. The female makes an incision in the leaf, and then deposits its eggs ; in a few days the young larva is hatched, and immediately commences to eat the leaves.

After a time the larva ceases to feed, and drops to the ground, where it buries itself and spins a cocoon, and remains for the Winter.

Oyster-Shell Bark Louse (*Aspidiotus Conchiformis*) or Common Apple Scale.—This pest has now spread all over the Colony, and may be found on almost all fruit trees. Many white thorn hedges which a few years ago were strong and vigorous have been rendered stunted, and, in some instances, have died out altogether from the attacks of these minute insects. With a little extra activity in applying the following remedies at the proper times it may be kept under.

The best time for destroying this pest will be some time in October, when the eggs have hatched out and the young larvæ are in a state of activity. This is only for a few days. They may be seen running about previous to attaching themselves permanently to the bark, where they make their final home. This pest is most vulnerable during this stage of its existence; but care must be taken not to use washes composed of potash in the Spring of the year, as such a dressing would certainly injure the foliage and young wood.

Black Scale (*Lecanuim Oleæ*).—This scale infests the olive, peach, apricot, plum and citrus trees.

Remedies.—The Californian remedy is to wash the trees with whale-oil soap—one pound to the gallon of water: applied hot. This dressing will also destroy the soft orange scale. For Summer syringing, use the wash recommended for the oyster-shell scale. When the scale attacks soft-wooded plants the best remedy is: two ounces of Gishurst's compound dissolved in a gallon of water; syringe the plants thoroughly, and wash with clean water the following morning. The dose may be repeated in a few days, if found necessary, syringing next morning with clean water.

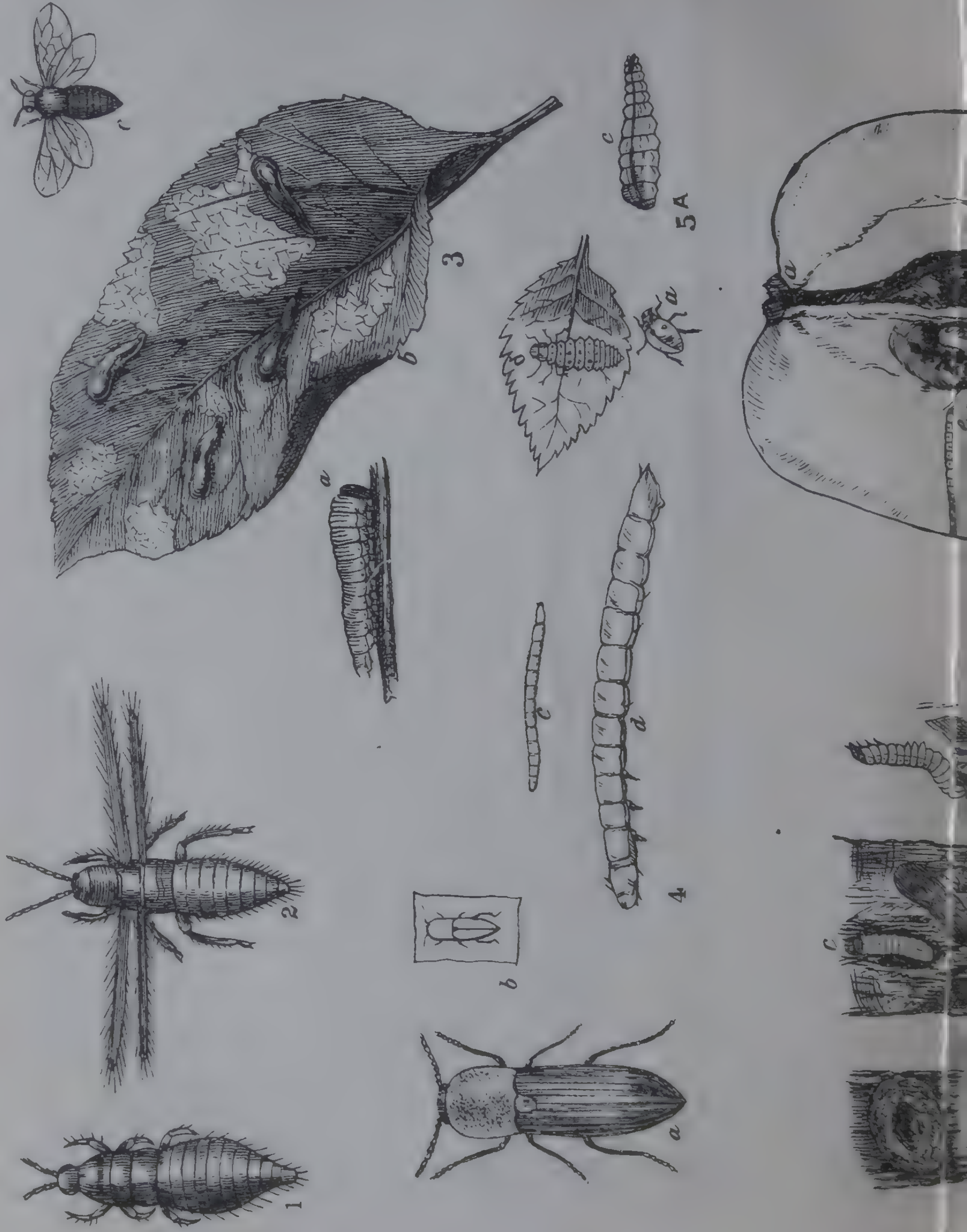
Codlin Moth (*Carpocapsa pomonella*). — This pest attacks the apple, pear, and quince; its ravages are principally confined to the apple, causing an annual loss of many thousands of pounds sterling to the fruit-growers of America,

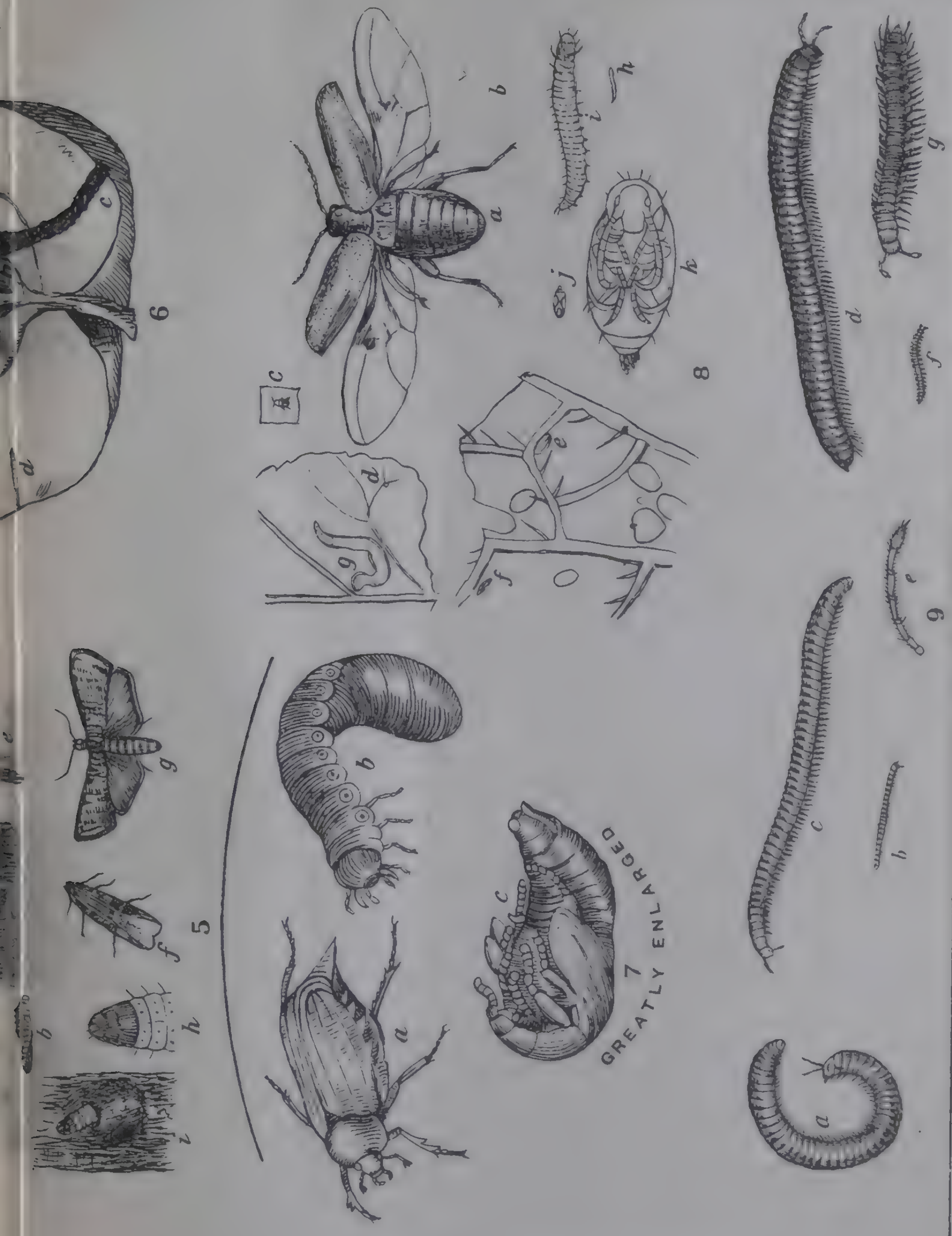
England, Tasmania, and elsewhere. The plan of attack is as follows :—When the young apples are formed, the moth deposits a single egg on each fruit, usually on the upper end, puncturing the rind at the same time. Each moth deposits from 70 to 80 eggs. The larva is hatched in from seven to ten days, and begins at once to eat its way into the apple. The following description is from Ormerod's "Injurious Insects" :—"The caterpillar is about half-an-inch long and slightly hairy, whitish, with a brown or black head and dark markings. As it grows, it continues its gallery towards the stem or the lower side of the apple, avoiding the core, when it makes an opening in the rind, and thus is able to throw out the pellets of dirt. After this opening is made, it turns back to the middle of the apple, and when nearly full grown pierces the core and feeds only on the pips, and as a result of this injury the apple falls." As soon as the apple falls, the caterpillar leaves the fruit and finds its way to the stem of the tree and secrets itself in the cracks and fissures of the bark, where it assumes the chrysalis form. The true larva of the codlin moth always destroys the pips of the apple—this will be a guide to those who sometimes have their apples injured by other grubs.

American Blight, or Woolly Aphis (*Schizoneura lanigera*).—This well-known pest is now common in most parts of the Colony. Many remedies for its prevention have been suggested with more or less success. The following mixtures are recommended :—Dissolve one pound of soft soap, one pound of sulphur, and four pounds of lime in enough water to make a thick wash ; apply with a stiff brush to all infected parts. A good scrubbing with Gishurst's compound, four or five ounces to the gallon of water, will be found servicable. The dressings should be applied whenever the blight makes its appearance. Remove all old bark, which should be burned, together with the prunings. Syringing has little effect on these creatures, as they are furnished with a soft downy covering which resists water.

Diamond Back Turnip Moth (*Plutella Crucifera*).—This destructive insect is now common in our

Plate 3.





gardens. The moth deposits her eggs on the under surface of the leaves of all the cabbage tribe. The caterpillar, which is green, attacks the underside of the leaves, and soon eats its way through ; completely riddling the leaf and destroying the plant. Several remedies have been suggested, such as dusting with lime, soot, and sulphur, but we cannot say that we have much faith in any of the remedies for the reason that the trouble is always on the under side of the leaf. Small birds are our best allies, especially the native white-eye.

Mealy Bug (*Dactylopius adonidum*). — This is a universal pest in hothouses ; it is also found in the gardens and nurseries. A fine mealy substance covers the body, hence the name. Gishurst's compound is one of the best means of getting rid of this troublesome pest ; fumigation, as recommended for aphids, may also be resorted to. Whatever remedies are used, they must be thoroughly carried out, otherwise the bug will soon destroy all before it. Mealy bug also attacks the leaves and bunches of grapes, rendering the fruit almost unfit for use. It harbours under the loose bark of the vine, in the border about the roots, and in walls and crevices in Winter. The only way to get rid of it is to clean all the loose bark off the vines in Winter, wash the rods, and afterwards paint them with a thick smearing, composed of clay, tobacco liquor, soft soap, and sulphur. Wash all the woodwork and walls, as recommended for the greenhouse. The leaves must also be watched, and washed with soap and water. This pest can only be eradicated by constant vigilance.

Grass Grub (*Odontria Zealandia*) commonly known as the Grass Grub.—The female deposits her eggs in the ground, where in a short time they change into grubs ; these, when full fed, are about an inch long. They are soft and white, with a reddish head and strong jaws. In this state the insect remains four years, during which time it commits terrible ravages on the roots of grasses, gnawing away at the roots, so that the turf becomes brown—completely destroying the lawn. They do not confine their attention to grass only, as they frequently destroy whole

plantations of strawberries and other plants. When full grown the larvæ burrows deeply into the earth and spin a smooth case, and then change into the chrysalis state. In this inactive form they remain till the following Spring. The perfect beetles then come from the ground, and commence an immediate attack on the leaves of trees ; concealing themselves during the heat of the day under clods, in the ground, and amongst herbage, commencing to feed as evening approaches. Everyone who has had to do with grass lawns has had experience of this pest.

Vine Louse (*Phylloxera Vastatrix*).—This is the most destructive plague the vine is subject to, as no means have yet been devised for preventing its ravages when once it gets into the vine border. Affected vines grow sickly and die. All that can be done to stay its progress is to root up the plants and destroy them ; and to allow the ground to remain fallow for a season. Vines should not be planted in the same land for at least three years. No well authenticated case of this disease has yet been reported in New Zealand, although well-known in Australia. It attacks the leaves and roots ; it is transmitted from place to place with the soil as well as with the plants.

Thrip is one of the most troublesome of all garden pests, destructive alike to melons, cucumbers, and greenhouse plants and ferns. If once they are allowed to establish themselves in a house, they are with difficulty got rid of. Thorough cleansing and fumigation as directed for the greenhouse is the only remedy.

Earth Worms.—Ten pounds of slacked lime to thirty gallons of water stirred up well together, and allowed to stand for two or three days, will, when free from sediment, form a liquid destructive to worms. Earth worms may be banished from flower pots by plugging the drainage hole with a cork, and then flood with lime water for a few hours ; this will drive them to the surface, when they should be gathered and destroyed. Lime water must not be applied to Rhododendrons, Azaleas, or Heaths.

Slugs may be captured by laying slices of apples, potatoes, or carrots amongst the pots : these should be

examined each morning, and the slugs found destroyed. Cabbage leaves will also answer the same purpose. A dusting of fresh-slacked lime applied late in the evening to young growing crops once a week, will effectually destroy these pests. Slugs deposit their eggs by hundreds below the surface of the soil.

Woodlice.—These vermin, in frames, may be destroyed in the following manner:—Press the soil all round the frame, and then pour boiling water where you have pressed. The same pest in a greenhouse or conservatory, may be got rid of by taking a boiled potato, and wrap it up in dry hay, and put it in a flower-pot. Place this in one corner of your frame, or wherever woodlice abound, and they will congregate in it in great numbers. It should be examined every two or three days, and the vermin shaken out into boiling water or the fowl yard. Another way is to keep some dry hay between two ordinary paving tiles; examine every day, and destroy those trapped. By so doing, their numbers will very soon be materially decreased.

Wireworms.—There is no plague in a garden more destructive than this little industrious, though slothful-looking insect. Where they abound whole crops are destroyed in a very little time, and if a solitary specimen get into a bed of carnations it will soon destroy the lot. One might almost think that a pair of carnations would feed a score of them for a month; but it attacks the root, eats its way upwards to the pith, kills the plant, and makes off for another. When turned up or disturbed the wireworm seems half asleep, and very slow in its movements. They are rarely seen to progress much, but they must be rapid travellers, or one could not do a tithe of the mischief it accomplishes. The only way to destroy them is to catch them; their shelly hides defy ordinary means of destruction. The creature may easily be detected; it is from one to one-and-half inches long, of a dull yellow colour, and stiff to the touch. By thrusting carrots into the ground many may be caught; every time you pull up the carrot you will find some sticking to it, eating their way in. Heaps of rotted turfs, the most useful of all sorts for potted plants, are very much infested

generally, and we have known several good plant growers to pass every particle of the mould in which they pot their plants through their hands before using it; such is their natural and well-founded dread of the wireworm.

Earwig.—This is the great enemy of the Dahlia grower (in the old country). They are very common in Tasmania, and are said to be becoming numerous in some districts in this colony as well. They also feed upon other plants. They are shy creatures and only feed at night. They devour the petals of Dahlias. They may be trapped by half filling thumb pots with dry moss, placed on the top of the Dahlia stakes. A better plan is to place some small tiles half full of moss near the plants they feed upon. Pieces of bamboo will answer equally well. They should be examined every morning the first thing, and the vermin destroyed.

White or Cotton Cushion Scale (*Icerya Purchasi*). —This is one of the most dangerous pests which the lemon and orange grower has to contend against. It is common in many parts of the North Island, and as far south as Nelson. Badly-affected branches, or even trees, should be cut down and burned at once. Syringing the trees with a solution of caustic potash, two ounces to the gallon of water, has been found most effectual. This most destructive pest has a natural enemy, but for which orange and lemon growing in California would have been abandoned, had it not been for a little native beetle (a ladybird), *Vedalia Cardinales*, which feeds on the scale. If the Vedalias are not to be had, a couple of dressings of kerosene emulsion will check the pest.

In addition to the above; Citraceous trees are subject to other scale insects all more or less injurious, such as leaf scale, olive scale, orange scale, and sandalwood scale. All of which may be destroyed in the same manner as recommended for the white scale.

Canker Worm (*Clenopseustis Obliquana*). — The caterpillar of this moth feeds upon the leaves principally of the apricot; fastening them together, it attaches them to

the ripening fruit, feeding upon the epidermis. The caterpillars of several moths having similar habits—attacking apples and other fruits—are confused by fruit growers under the general term of canker worm. Hand picking where practicable is the best remedy.

Currant Borer (*Aegeria Tipuliformis*.) — This destructive insect is a small moth, nearly black to the naked eye. Seen through a glass, it is beautifully marked with golden yellow bands across the body. This insect may be seen hovering about currant bushes early in Spring. It lays its eggs in interstices in the bark of the young wood of currant bushes. These soon hatch out small white grubs; these immediately eat their way into the branches, and devour the pith. The affected branches lose vitality, and break off readily with high winds. As soon as observed the affected branches should be cut out and destroyed. Spraying with kerosene emulsion a couple of times before the fruit begins to swell for ripening will, to some extent, keep the pest at bay.

Mildew on Vines (*Oidium Tuckeri*).—This vegetable pest is caused by sudden chills, cold damp, and badly-ventilated atmospheres. Mildew first made its appearance in England in 1845 and 1847. It appeared on the Continent, and laid waste hundreds of acres of vineyards. In 1851 the disease appeared in Italy, and in 1871 it appeared in the colony of Victoria. The first notice of it appeared in the *Australasian* of the 16th December, 1871. At last it was discovered that the fumes of sulphur had the effect of completely destroying the pest if properly applied, and at the right time. The action of sulphur in the cure of oidium (mildew), is due to the formation of sulphurous acid gas by the action of the oxygen of the atmosphere on the finely subdivided particles; and as dryness and heat are essential to the oxidation of sulphur, it may be readily understood how it is that sulphur will not act curatively in wet, cold weather. After pruning, every bit of refuse should be collected and burned. The stems should then be washed with a solution of sulphur and lime; this will stay the development of any germs which may be present. The

addition of cow-manure and yellow clay will render the application more efficacious. By painting the hot-water pipes with this mixture an atmosphere will be created which will destroy mildew or red spider. Dusting with flour of sulphur, applied with a fumigating bellows, is also efficacious. When mildew attacks melons, cucumbers in frames or elsewhere, a little flour of sulphur dusted over the plants and on the soil under the leaves during hot weather will drive off noxious insects, and destroy the mildew. This remedy will also answer for all kinds of plants attacked by red spider or mildew.

Rust.—Rusty grapes are caused by sudden draughts of cold air against the berries when they are just set. Excessively hot pipes will produce rust sooner than anything else. Handling the grapes should be avoided as much as possible. Ordinary care will prevent this disease.

Warty Leaves in vines are the result of a close, damp atmosphere and insufficient ventilation; they never appear under any other conditions. The leaves become cupped and crumpled. The growth of the plant is greatly retarded—in bad cases completely arrested. The only preventives are a dry atmosphere and plenty of air.

Shanking in vines. This disease is the result of bad culture and unsuitable soil, although it sometimes attacks vines which have every attention. The disease attacks the foot-stalk of the berries at or after the stoning period, when the berries are changing colour. They lose their fleshiness, have a disagreeable acid taste, and soon shrivel or drop off if the bunch is shaken. There seems to be no certain remedy against this troublesome disease.

Spot in Pelargoniums is caused by the plants being overcrowded and over-watered, but a remedy will be found in the following mixture, if applied through a syringe:—One teaspoonful of Condry's disinfecting fluid to a quart of water. After doing this a few times the disease invariably leaves the plant.

Canker.—Fruit trees are subject to several different diseases, and each of them often goes by the name of

canker. Practical cultivators, however, know well enough what canker is. A portion of the bark becomes diseased and dies, the dead portion falls off, leaving the wood exposed, which also decays, and when the trees are badly attacked whole branches die off. Of course wherever there is decay insects or fungoid growths appear; and it is not unreasonable to assume that insects may be the cause of canker, which some have averred, but in reality they are only the result of the disease. At all events, it has been proved over and over again that the roots getting into wet, sour subsoil is the cause of canker, and that lifting them up nearer to the surface and giving them suitable soil to work into will cure it, or at least arrest the decay.

Curl-Leaf in Peaches.—Curl-leaf in peaches is due to a microscopic parasitic fungus, called *Exoascus deformans*, and can be cured by spraying the trees in Winter with strong Bordeaux mixture, and may be kept in check during Summer by spraying with a weaker form of Bordeaux mixture.

Root Fungus (*Lycoperdon Gemmatum*).—This pest is becoming a terrible scourge in many parts of the North Island, destroying all kinds of fruit trees, forest trees, herbaceous plants and grasses. It is particularly destructive in the Waikato district; it is also very destructive in the Thames district, where it has destroyed many chains of thorn hedges. It has already killed many thousands of pounds worth of orchard trees in the Hamilton and Cambridge districts. Its ravages are principally confined to warm, sandy lands, especially fern lands. It rarely, if ever, attacks trees planted in strong moist soils. Several remedies have been suggested for the destruction of the fungoid growth, such as applications of tar water, gas lime, soot. The most successful method we have heard of is to saturate the soil before planting with tar water. Root fungus has not, so far as we know, been observed in the South Island of New Zealand.

Lichen or Moss frequently attacks the stems and branches of neglected trees whose roots have got into a hard and impervious subsoil. The only remedy is to encourage

the trees to make surface roots by softening the surface soil and topdressing with manure ; scrape the trees and apply a dressing of lime wash in the Autumn. Soft soap two pounds, and one pound of salt to five gallons of warm water is said to be an excellent dressing. Applied with a brush, or with a spray where the trees are too numerous. This will prevent the growth of moss, and destroy any grubs which may be found lurking under the loose bark. If the trees are not too old they will be greatly benefitted by transplanting, as recommended under that heading.

REMEDIES FOR INSECT PESTS.

Fumigation for Green Fly, Red Spider, etc.—

Mode of Application.—Get an old oil or nail can, punch holes in it for the purpose of ventilation ; then make a fire of sticks inside the can. Do this outside the house. When the sticks have been reduced to a red mass in the bottom of the can lift it inside the house. Take about $\frac{1}{4}$ lb teased out tobacco leaf, slightly damped with water, place it on the red embers and leave the house, closing it up for the night. Syringe the plants next morning, and ventilate fully. Repeat the operation in a few days, syringing afterwards. $\frac{1}{4}$ lb. tobacco will fumigate a house 20 ft. x 12 ft.

Some of our small birds are of service in destroying Aphides, especially the native white-eye. The Ladybird beetles (so common in England) feed on them voraciously. The following is also a good wash for destroying green, blue, or black Aphis :—To fifty-six gallons of soft water add six pints of sulphurous acid, mixing thoroughly. Syringe the trees in the evening.

Red Spider.—*Remedies.*—For the spider in glass houses and frames—to every gallon of tobacco-water add two pounds of flour of sulphur and as much quicklime as will make the mixture as thick as whitewash, and with this wash your pits, frames, or houses inside ; for the mixture, when the sun is on it, will create an atmosphere in which no insect can survive. Another method of destroying the

spider is by laying flour of sulphur on slates or boards about the house, where the sun will play upon it. The fumes caused by the heat will destroy the insects. Fumes of burning sulphur will soon rid a house of these and other pests ; but the greatest caution is necessary in using sulphur in this way, or the remedy may prove far worse than the disease. We have seen a whole year's crop of vines destroyed by an overdose ; in fact it should never be burned where plants are growing. Cucumbers and melons, in frames or out of doors, are frequently much injured by the spider. They may be got rid of by dusting the surface of the soil, which should be frequently stirred, with fresh slacked lime and flour of sulphur.

In the case of fruit trees infested with red spider—the leaves as they fall in Autumn should be carefully raked together and burned, and all prunings should be treated in the same manner. The stems and large branches should be scraped and receive a dressing—composed of soft soap containing nine per cent. of potash. This soap mixed with twenty-five per cent. of its weight of flour of sulphur ; one pound of this mixture to the gallon of water will be strong enough. Apply with a stiff brush, and rub well in. Soft soap and salt is highly recommended for washing the trees in winter after being scraped.

Summer Wash.—Trees infested with red spider may be syringed with the above solution without injury to the foliage. The success or otherwise of these dressings depends entirely on the manner in which the washing or syringing is carried out. The red spider, like all other parasitical insect pests, lives on the sap of the plant it attacks.

Pear Slug.—*Remedies.*—The best known is Hellebore ; two ounces to the gallon of water. Saturate the foliage with this mixture top and bottom. One application when the slug first makes its appearance will usually suffice. Finely slacked lime, or road dust, may be used with advantage, for scattering over the leaves—a little flour of sulphur added will be of service—in checking the progress of the pest.

Oyster-shell Bark Louse (*Common Apple Scale*). —A good winter dressing is made of lime, sulphur, and salt. Take 10 lbs. of lime, 20 lbs. of sulphur, and 20 gallons of water. Boil for not less than one hour and a half, stirring the mixture the whole time (if this is neglected the lime will settle in the bottom of the boiler, and the bottom will burn.) When the sulphur has been thoroughly dissolved the mixture will be of a light amber colour. Slack 30 lbs. of lime in a barrel with hot water, adding the salt. When this is dissolved the whole should be added to the lime and sulphur in the boiler, and the whole boiled for half an hour longer; then 50 gallons of water may be added. Strain through a wire sieve, and keep well stirred while being used. This is an excellent Winter dressing. There are many others recommended, all of which have more or less to recommend them, such as Little's Sheep Dip, one in 20—that is one gallon of dip to 20 gallons of water—applied with a brush to the trunk and stronger branches in July or August.

Resin Wash. — This wash is also recommended for scale insects. 20 lbs. of resin, 6 pounds of caustic soda (70 per cent.), 3 pints of fish oil, water to make 80 gallons. Place the resin, caustic soda, and fish oil in a large boiler with 20 gallons of water, and boil for three hours; then add hot water slowly, and stir well till there are at least 40 gallons of hot solution; then add cold water to make the total 80 gallons. Never add cold water when cooking, or the resin will be precipitated, and it will be difficult to get it in solution. A dressing this strength to citrus trees. A Winter wash may be stronger, the total amount being made up to 54 instead of 80 gallons.

Grass Grub.—*Remedies.*—There does not seem to be any very certain method of coping with these pests, as the damage to the grass is usually done before the presence of the grub is detected. Constant rolling with a heavy roller, especially after rain, will so consolidate the soil as to impede the motion of the grub. The weight of the roller crushes those near the surface. Flooding with water impregnated with gas lime, is also recommended. More reliance can,

however, be placed in constant rolling during Summer, Autumn, and Spring. When lawns become badly infested with the grub, the only alternative is to fork over the surface and turn on the fowls; they will soon devour all within reach. Then apply a heavy dressing of gas or ordinary lime, at the rate of 10 lbs. to the square yard, with a couple of pounds of soot, and dig in. This should be done in Autumn, and the land should be left turned over roughly until Spring, when it may be sown again with grass or cropped. Professor Kirk says that this grub attacks the roots of trees, even the strongest-growing, such as *Pinus Insignis*, *Araucaria Imbricata*, and a number of others.

Apple Scab (*Fusicladium dendriticum*).—This fungus growth is most destructive to fruit growers, particularly on apples and pears, the leaves as well as the fruit. There are very few, if any, orchards free from this pest. Treatment—Syringe the trees a little before the bloom appears, and again when the fruit is setting, and again when the fruit is half grown. The most approved dressing for this pest is that known as Bordeaux Mixture, made as follows: take 6 lbs. of sulphate of copper (bluestone), 4 lbs. of slacked lime, 22 gallons of water; dissolve the bluestone in 4 gallons of hot water; dissolve 4 lbs. of quicklime in 2 gallons of water. When cool mix, and make up to 22 gallons with more water; strain, and keep constantly stirred whilst using.

Shot-Hole Fungus (*Phyllosticta circumcissa*) of apricot and peach, but more particularly on the apricot. Called Shothole because in bad cases the leaves are riddled with holes as though they had received a charge of shot from a gun. This is a common disease, and may be kept in check if lightly but thoroughly sprayed with Bordeaux Mixture.

Strawberry Leaf Blight (*Sphaerella fragaria*).—This is fungus which attacks the foliage of strawberry plants, preventing the plant perfecting its leaves. It is easily detected, as the affected leaves soon turn brown, small purple and red spots appear on the upper surface of the leaves, and rapidly increase in size till the whole leaf is discoloured,

and, if not checked, it will render the growing of strawberries almost impossible. When the disease is prevalent, the practice is to mow the beds immediately after the fruit is harvested, rake the leaves together and burn; then cultivate the soil, adding two or three hundredweight of manure per acre (2 cwt. finely-ground bones and 1 cwt. of superphosphate), spraying the leaves when first the disease is noticed with Bordeaux mixture is said to be efficacious.

EXPLANATION OF PLATE 2.

No. 1 Red Spider greatly magnified. Natural size, half as large as a small pin-head.

No. 2 to 13. Scale Insects (*Hemiptera Homoptera : fam. Coccidæ*).—For practical purposes it will be sufficient to divide the Coccidæ into three great sections, viz.—(1) Diaspidæ—Flat scales adhering to the part of the plant on which they are fixed, without a slit or division at the posterior end of the scale. (2) Lecanidæ—Also fixed, but having a notch or slit at the posterior end of the scale. Many of them having a cottony excretion. This is never found in the Diaspidæ; but may or may not be present in the (3) Coccidæ; these being distinguished from the others by not being fixed, and by their walking about in all their stages. It must however be remarked that the species of all the three sections move about the first day or two after being hatched. After that time the Diaspidæ and Lecanidæ fix themselves to the plant by suckers, and never afterwards move.

No. 2. Diaspis Ostræformis.—Branch with scales upon it. Natural size. Fig. 3, scale seen from above magnified. Common on the bark of pear trees.

No. 4, 5, and 6. Mytilapsis Pomonum.—Apple tree scale, natural size and magnified.

No. 7, 8. *Pulvinaria Vitis*.—Vine scale. 7. Sketch of adult female scale on vine scale, natural size. Fig. 8. Adult female, magnified.

No. 9, 10. *Lecanium Hibernaculorum*.—Brown scale. No. 9. Twig with scale upon it, natural size. Fig. 10. Adult female scale, magnified. This scale is the pest of hot-houses. *Lecanium filicum* is found on ferns, *L'hemisphæricum* on dracaenas, *L'rotundum* on the peach, &c.

No. 11. *Lecanium Hesperidum*.—Magnified and natural size. Known in France as the orange-tree bug, or orange-tree louse.

No. 12, 13. *Dactylopius Adonidum* (*Coccidæ* proper).—Mealy Bug. 12. Part of leaf with Mealy Bug upon it, natural size. 13. Sketch of adult female magnified and natural size. The mealy secretion which is excreted by this insect, and to which it owes its name, is exuded all over the body.

No. 14 to 16. *Phylloxera Vastatrix* (*Phylloxeridæ*).—Fig. 14. Vine root attacked by *Phylloxera*, natural size. Fig. 15. Subterranean form of female, magnified and natural size. Fig. 16. Part of leaf of vine, showing the galls formed on the leaf by the *Phylloxera*, as seen on upper and under surface of leaf.

No. 17 to 19. *Eriosoma Lanigera* (*Aphides*).—Apple-tree or American Blight. Fig. 17. Apple branch attacked by the blight, natural size. Fig. 18. Wingless larva, natural size and magnified. Fig. 19. Winged females, magnified.

No. 20 to 22. *Siphonophora Rosæ* (*Aphides*).—Rose Blight. Fig. 20. Young larva newly hatched and magnified; natural size and magnified. Fig. 21. Larva, more advanced stage, magnified. Fig. 22. Winged male, natural size and magnified. *Aphis rosarum*, *A. dirhoda*, *A. trihoda*, &c., also attack rose trees.

EXPLANATION OF PLATE 3.

No. 1, 2. Thrip Larva magnified. Fig. 2. Perfect insect magnified.

No. 3. Selandria Cerasi.—Pear Slug. *a* Pupa, *b* leaf with larva feeding, *c* female fly.

No. 4. Wireworms, Grubs of Click Beetles.—Fig. *a*, *Elater Obscurus*. Fig. *b*, *Elator Spulator*, natural size. Fig. *c*, *d*, larva of *Elator Agriotes*, natural size and magnified.

No. 5A. Coccinella Maculata.—Spotted Ladybird. These well-known little creatures are good friends to the horticulturists, as they feed voraciously on the Aphides, especially in the larvæ stage. They often deposit their eggs in the midst of a group of plant lice, which the newly-hatched larvæ greedily devour. *A* perfect beetle, *b* larva, *c* pupa.

No. 5, 6. Carpocapsa Pomonella—Codlin Moth.—*a* Nest of larva as it appears on inside of bark when taken off the tree, colour drab. *b* Pupa or chrysalis; colour dark amber. *c* Appearance of larva when cover is removed off Winter nest; colour, body yellowish white, head dark brown. *d* Winter nest when larva is removed following Spring. *e* Larva looking for a tree or place to make its nest, when ready to assume the pupa or chrysalis forms; colour of full grown larvæ light pink. *f* First appearance of moth. *g* Moth with wings spread, length of body $\frac{7}{16}$ of an inch; spread of wing $\frac{3}{4}$ of an inch; colour, body and legs rich bronze, light drab; four wings, mottled grey and drab, with dark copper bar across hinder margin, in which is a golden ocellated patch near inner angle; hind wings plain drab, a little darker than body. *h* Head of larva as seen through a glass magnifying nine times. *i* Pupa or chrysalis case, prior to moth leaving it.

No. 6. *a* Blossom end or calyx of apple. *b* Represents an empty space where ovarium or shell containing the seeds

were before the entrance of the larva. *c* Represents the burrow made by the larva, by which it escapes from the fruit when it is ready to assume the chrysalis form. *d* Appearance of larva in burrow when six days old. *e* Appearance of larva in burrow when ten days old.

No. 7. Odontria Zealandia—Grass Grub, greatly magnified.—Fig. *a* the female, *b* the grub, *c* the pupa or inactive form.

No. 8. Haltica Nemorum—Turnip Beetle (or fly).—Fig. *a* and *c* beetle, *d* and *e* eggs, *f*, *g*, *h*, *i* maggot, *j*, *k* pupa. All natural size and magnified.

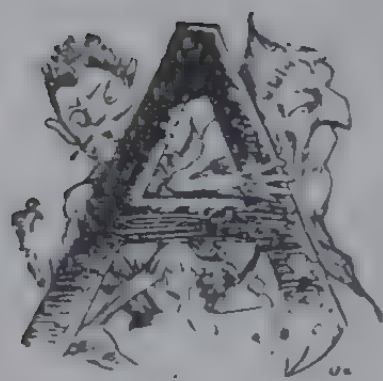
No. 9. False Wireworms, or Snake Millipedes.—*a* *Julus londinensis*, *b*, *c*, *J. guttatus*, natural size and magnified, *d*, *J. terrestris*, *e* horn, *f*, *g* flattened Millipede.





USEFUL HINTS.

(From the best Authorities.)



ASPHALT Garden Walks. — Excellent walks may be made in the following manner: — Remove the surface soil for four inches, make the bottom perfectly level and roll; then spread a coating of tar, and sift coal ashes over—say one inch thick. When this is dry give another coat of tar and ashes, and repeat until you have four coats of tar and as many of ashes, rolling each time. Such a path will always be dry and hard, and will resist weeds and wear for years.

Guano.—This is a most excellent manure for top-dressing grass plots, or for growing all the cabbage and onion tribe. The best guano is the genuine Peruvian; but any of the other kinds will answer, only they must be used in much larger quantities. Three pounds of Peruvian guano will suffice for a square rod of ground (five and a half by five and a half yards); before spreading, the guano should be mixed with twice its own bulk of dry earth or sand. The other guanos may be applied as purchased, and in double the quantity. Guano is an excellent manure for onions also. Apply Guano to grass plots, if possible, immediately before

rain. Guano is an excellent dressing for flowers in pots, a pinch of Peruvian between the finger and thumb will suffice.

Liquid Manure.—Half an ounce of Peruvian guano to the gallon of water will suffice for pot plants, such as Pelargoniums, Calceolarias, Cinerarias, Achmens, etc. ; and one ounce per gallon to plants out of doors. Growing plants in pots will be greatly benefitted by a watering of the weaker mixture once a week.

Liquid Manure.—Put a bushel of soot into a porous bag, immerse it in 20 gallons of water, allow it to stand for a few days ; then use as required, watering pot plants (almost all kinds) once a week.

Liquid Manure Suitable for any Plant.—Put a bushel of horse-droppings into ten or twelve gallons of water, well stirred and allowed to stand for a couple of days. The clear liquid only must be used ; twice a week to growing plants.

Night-soil for Garden Use.—Ten parts of earth to one of night-soil is the proportion to be used ; mix well, and turn frequently. A small quantity of lime will act as a deodoriser. The compost should lie in a heap for at least three months before being used.

Poultry-manure as a Liquid Manure.—Twenty pounds dissolved in ten gallons of water will be strong enough. This should not be used more than once a week.

Poultry-manure as a Dry Compost.—This should be mixed with ten times its bulk of light soil or sand, and laid by for a few weeks. This manure should never be used in a raw state.

Transparent Covering for Frames, etc., may be made of cheap, thin calico, covered with a composition made of three parts pale linseed oil, one ounce of sugar of lead, and four ounces of white resin. The sugar of lead to be ground with a small portion of the oil, then add the remainder of the oil ; the resin should then be put with it, the whole mixed, gently warmed, and stirred till the ingredients are thoroughly incorporated with each other. The material to be covered is to be stretched and tacked to

a frame or to a floor, and the mixture laid on with a large paint brush. The next day it will be dry, and may be rolled up or applied to its use as a covering for frames. The best way is to put it on a roller.

Wood, how to Preserve.—Mix at the rate of five pounds of chloride of zinc to twenty-five gallons of water. This is the very best solution to steep wood in to prevent the dry rot.

To Preserve Timber in the Ground.—Take boiled linseed oil and stir in pulverised coal to the consistency of paint. Put a coat of this over the timber. This will preserve the timber sound for many years. See that the timber is well seasoned before applying the mixture.

Rules for Watering Pot Plants. — Never give water until it is actually required, and then enough should be given to reach every part of the ball. Watering by dribblets is the worst of all practices. By such a system one portion of the roots is perishing with drought, while the other is surfeited with water. A little careful observation is, of course, necessary, especially with respect to plants grown in peat soil; and if any uncertainty exist as to whether or not the plant wants water, strike the pot with the knuckle on the side; the ring produced will, with a little practice, prove an unerring guide. If this plan is followed for a short time, the ring of the wet pot will be readily distinguishable from that of the dry one; this, therefore, taken in conjunction with the appearances which the plants exhibit, must determine when water is to be applied or not.

The above instructions are more particularly applicable to the Winter culture of pot plants.

Air in Greenhouses.—The circulation of air is one of the most important provisions in all kinds of horticultural buildings. Nothing but that will fairly exclude damp, or in any damp weather counteract its effects. It is not enough to open every front window. It would be far better to open only one and let down a top light a little. In all cases there should be an outlet as well as an inlet, and for the want

of this many houses do not answer well for plants. A circulation of air causes a more rapid evaporation, and it is a common thing among good gardeners to open a lower window even in wet, cloudy weather, let down one of the top lights a little, and light a fire.

Potted Plants.—All plants in pots, when exposed to the sun and wind, require frequent watering, and simply because the pots dry fast, when the fibres of the plants suffer directly. When pots are in the open air they should be plunged; but there is another mischief that awaits them if this be done—worms get into the pots, and the roots get out at the bottom, and, striking into the earth, excite a growth which is not desirable while there, and causes a severe check when the pot is removed and the roots that have struck through into the ground are broken off, because the plant has depended on them for all its extra growth. The best plan to adopt is to place the pots in saucers. If they are to remain in the same situation all the Summer it will be worth while to pack them, as it were, in ashes, gravel, or naturally dry material, because the watering of the pots will moisten whatever they are packed in.

Cats are sometimes very destructive to young trees, by tearing the young bark with their claws. Protect the stems by tying a thin layer of gorse round the stem for two feet high; wire-netting will also answer.

Hares and Rabbits, especially the former, are very destructive to all kinds of deciduous trees while young. Scores of trees, especially fruit trees, may be destroyed in one night by hares stripping the stems of their bark. It will pay to enclose the whole orchard with wire netting, which may be had at from 4d. to 6d. per yard. Where there are only a few trees they may be protected by tying gorse round the stems for a couple of feet from the ground upwards.

Fowls and Pigs in the Orchard.—Fowls do a large amount of good during the Winter and Spring and early Summer, scratching about the trees and feeding on insects and grubs. If pigs are turned in in Autumn, after the crop has been gathered, they will pick up the waste fruit.

How to Know the Edible Mushroom.—When any doubt exists, put a little table-salt over the gills, which, if the mushroom be genuine, will turn black in a short time. Salt has no effect on poisonous fungi.

A Compost Heap.—What is it? A heap of manure properly made ; a repository of all kinds of otherwise obnoxious matter, converting the same into harmless yet most valuable plant food. I say properly made, for there are heaps, and heaps, and it is almost rare to find one so built as to rot well, and not to be either surrounded by valuable liquid which is too often allowed to run waste, or else the heap is thrown up anyhow to dry instead of rot, and much of its value is lost in that way.

To make a proper compost heap there must be a fair proportion of stable manure. Having that at command, first dig out an oblong trench in a convenient situation ; say eight feet or twelve feet for a garden : twice or three times the size for a field ; throw out all the black soil down to the clay on one side, leaving the other side clear for wheeling or carting alongside. Commence with, say, a layer of coarse stable manure about six inches thick, spread evenly over the bottom, then build up layer by layer evenly and flat with the clearings of hedge rows, ditches, grass walks, weeds of all kinds (unless with ripe seeds, when they should be burnt), lawn mowings, leaves, and pea or bean stalks, etc., in fact anything which will rot, always shaking out the stable manure or green stuff into an even layer, never so much as a barrowful being left in one spot, building up the sides as plumb as the walls of a house. Between every three or four layers throw a sprinkling of the earth taken out to prevent it heating too much, or a dressing of ashes if at hand, also all the kitchen or house waste (old boots or tin cans excepted), and don't forget to add the droppings from the fowl-house, breaking up any lumps, or better still, throw dry earth under the roosts, and clean out oftener and so prevent lumps. After every layer of stable manure or green stuff, tread it down well, and so on, layer by layer, never more than four or five inches of any one kind ; or if there should be rather more stable manure than other

materials, throw over more soil, which will absorb the moisture and assist in the decomposition; scratch the sides down with a fork, leaving it as neat as a stack, but with a flat top, and when about four feet high cover over all with a layer of three or four inches of soil to keep in the ammonia; then if at hand, after it has been allowed to heat for a week or so, throw over it liquid waste from the house, etc., and if any liquid should run from the heap, dig a hole at the lowest corner to catch it, and throw it back over the top. Of course if pigs and cows are kept the mixture will be all the better; and in about three or four months the whole will be found in prime condition for any kind of crop. A heap of this kind should always be under weigh, so as to dispose of all waste or decaying matter, and the garden, etc., may be kept in much better order; and whenever the heap gets about four feet high, top up and start another.

How to Make a Mushroom Bed.—Get half-a-dozen loads of stable manure; shake out the long straw, and put the short manure in heaps to ferment. Turn it soon, when it should be turned to let out the fiery gases, and moderate the heat, when it is ready for putting together. The way to make the bed is to place the manure ridge fashion, say three feet or four feet through at the bottom, and about the same in height, making it narrow at the ridge, and treading it down quite firm as the work proceeds, placing the long litter in the centre. The treading prevents overheating, and retains the heat longer, saving all the ammonia. When thus made up and the heat has subsided to 75 deg. or 80 deg., it is ready for spawning. This should be done by making holes in the sides of the bed a foot or so apart. In these put pieces of spawn about the size of small apples, and cover the bed thickly with long straw to ward off wet and maintain an equable temperature. In a couple of weeks or so the spawn will have run sufficiently for the bed to be earthed up, which should be done by placing an inch thick of soil over it and patting it down firm and smooth. Then replace the straw as a protection to the mushrooms, which will make their appearance in eight or ten weeks. In gathering mushrooms never cut them, only twist them gently off; if cut, the remaining stems soon rot, and injure

the succeeding spawn. To be successful the site for the bed must be a high and dry one, for if low, and water lies or soaks into the manure, it will drown and perish the spawn, and failure will be the result. If the object is to have mushrooms during Summer, the position chosen for the bed should be a cool, shaded one, a good place being in an orchard under trees, or at the back of a south wall or building where the sun does not shine, as mushrooms cannot endure hot air, and must have plenty of atmospheric moisture, in imitation of what they get naturally when they come up in pastures and other places during the Autumn. The thick covering helps to give them this, as it arrests evaporation and the vapour escaping from the soil is held in suspension under the straw. Even in some mushroom houses it is necessary to cover the beds, as when the houses are lofty or not closely sealed, the atmosphere becomes arid, and the mushrooms die off as soon as they show themselves through the bed. Spawn may be had from most seedsmen.

How to Make Mushroom Spawn. — Lay a foundation of horse droppings, say a square yard, let the first layer be four inches deep; have some artificial spawn ready crumbled into dust, of which scatter a handful over the first layer, and tread it down hard; and then put another layer of horse droppings, and then more spawn, and so on till the heap is about two feet high. The heat should not attain to more than 80 deg. Cover the heap slightly over with straw, and in about five or six weeks there will be a fine heap of pure spawn to scatter over newly-made beds. If kept dry the spawn will keep good for five or six months.

How to make a good Hotbed. — In the first place, the manure must come from a stable where the horses are fairly well fed—receiving a moderate amount of corn—the dung from grass-fed animals being poor and sour. Get a good heap of it laid together, and when it heats turn it over with a fork, shaking it out bit by bit and rejecting any rubbish or long straw. Let the heap lie till warm again, then repeat the process twice or thrice again, till all the rank steam and strong heat has gone off, when the bed may be

made up. In a glass of water, without sugar, will generally freshen the face, or relieve a headache. If the hand be stained, there is a very strong, remove the stains better than a lemon, or a benefit, as a rule. After the juice has been squeezed from mix the materials so can be used for this purpose. Lemon as you go. A good remedy for rheumatism and the so-called bed-ridden.

Spring. In the latter case the juice The bed should always be kept at breakfast. The pulp may also be than the frame, and if to last of skin. Lemon juice and back will be none too much and to relieve coughs and sore down considerably. The bigger the better as sweet. As a drink, heat last, provided that it does not exceedingly wholesome. "burned," when it will soon be over. Made in the Winter be dry, and in cold windy weather throw a cool lemonade tarpaulin over the windward side of the bed if thirsty. As a a lot of heat. Better in taking

How to Fumigate.—Fumigating cans may be found in any seedsman's shop. The following plan is—Spinach simple and efficient. Take an empty nail can or tins. The perforate it with holes in the bottom and half-way up the sides. In this light a fire of sticks (two or three handfuls); while this is burning, prepare the leaf, which may be damaged tobacco from the stores, local green leaf, or tobacco paper. If the former, take a quarter-of-a-pound, tease it up, slightly damping it with water; by this time the fire will be a red mass of charcoal; lift the can into the house, placing it on a couple of bricks on the floor, then drop the leaves into the red embers; leave the house and close the door and all ventilators. If the other materials are used, a larger quantity will be required, about quarters of a pound of either. Evening is the best time to fumigate. Next morning syringe all the plants with water. It will be necessary to repeat the process in consequent days afterwards. This is a good remedy for promoting

Advantages of Budding.—Budding the white ones properly, is not without its advantages. For instance, there are some trees which are more readily budded than by grafting. Budding may be later in producing fruit than grafting. Budding is recommended by the French as a good remedy for insomnia.

the succeeding spawn. To be successful the site where a plant, must be a high and dry one, for if low, and when a graft soaks into the manure, it will drown and perish. Fruits and failure will be the result. If the soil is another; and mushrooms during Summer, the position is now rose, which is should be a cool, shaded one, a good well when budded orchard under trees, or at the budding fruit trees are building where the sun does not means of budding they cannot endure hot air, and must be by any other method. moisture, in imitation of what is seen of this mode of improving come up in pastures and

The thick covering help **Pots.**—The successful cultivation evaporation and the depends in a great measure upon the in suspension upon the materials employed in potting. The houses it is not essential to success is perfect drainage; if are lofty or no plant can continue long in a healthy state, arid, and the in a pot or in the open ground. The first themselves serve in potting is to place two pieces of broken most seeds over the hole in the bottom of the pot. Arrange

that they may lie side by side. These pieces should be a slightly concave form, and the concave sides should be placed downwards; this will enable the water to pass off freely. The next point is, the best kind of material to use above these pieces, and this is broken pots. For very small plants these may be reduced to the size of peas, but they should be increased in proportion to the size of the pots. Four-inch and smaller pots would require the size mentioned, but from that to eight-inch pots may be drained with a coarser kind, say the size of Windsor beans, and for larger a finer or three times these dimensions will answer. The If kept of the drainage must also be guided by the size of the

How to three-quarter inch will be enough for small pots, one the manure in sizes, and for larger sizes $1\frac{1}{2}$ inch and fairly well fed will occasionally be required. It is an error, dung from grass is too much, as it must obviously be at the good heap of it laid in which the plant has to feed. A with a fork, shaking regulation of the drainage is, therefore, rubbish or long straw. order that the object aimed at may then repeat the process to

steam and strong heat help **the Lemon.**—Lemons are one of our domestic economy. The juice

of half a lemon in a glass of water, without sugar, will generally cure a sick headache. If the hand be stained, there is nothing to remove the stains better than a lemon, or a lemon and salt. After the juice has been squeezed from the lemon the refuse can be used for this purpose. Lemon juice is also a very good remedy for rheumatism and the so-called biliousness of Spring. In the latter case the juice should be taken before breakfast. The pulp may also be eaten, avoiding every particle of skin. Lemon juice and sugar mixed very thick is useful to relieve coughs and sore throats. It must be very acid as well as sweet. As a drink, lemonade is not only a luxury, but exceedingly wholesome. It is a good temperance drink. Hot lemonade in the Winter will break up a cold if taken at the start. Cool lemonade in Summer will refresh one who is tired and thirsty. As a harvest drink it has no equal. There is no danger in taking too much, and it never produces drunkenness or disease.

Medicinal Properties of Vegetables. — Spinach has a direct effect upon complaints of the kidneys. The French call it "The broom of the Stomach."

The common dandelion, used as greens, is excellent for the same trouble.

Asparagus purges the blood. Celery acts admirably upon the nervous system, and is said to be a cure for rheumatism and neuralgia.

Tomatoes act upon the liver.

Beet and turnips are excellent appetisers.

Lettuce and cucumbers are cooling in their effects upon the system.

Onions, garlic, leeks, and shallots, all of which are similar, possess medicinal virtues of a marked character, stimulating the circulatory system and the consequent increase of the saliva and the gastric juice, promoting digestion.

Red onions are an excellent diuretic, and the white ones are recommended to be eaten raw as a remedy for insomnia. They are a tonic and nutritious.

A soup made from onions is regarded by the French as an excellent restorative in debility of the digestive organs.



USEFUL TABLES.

Trees required to Plant an Acre of Land.

| Distance apart. | | No. required. | Distance apart. | | No. required. |
|-----------------|-----|---------------|-----------------|-----|---------------|
| Ft. | In. | | Ft. | In. | |
| 3 | 0 | 4,840 | 9 | 0 | 538 |
| 3 | 6 | 3,556 | 10 | 0 | 436 |
| 4 | 0 | 2,722 | 12 | 0 | 302 |
| 4 | 6 | 2,151 | 14 | 0 | 223 |
| 5 | 0 | 1,742 | 15 | 0 | 194 |
| 6 | 0 | 1,210 | 16 | 0 | 171 |
| 7 | 0 | 889 | 18 | 0 | 135 |
| 8 | 0 | 680 | 20 | 0 | 109 |

Number of Plants in a Rod of Land.

(160 Rods to the Acre.)

| Distance apart. Inches. | No. of Plants. | Distance apart. Inches. | No. of Plants. |
|----------------------------|----------------|----------------------------|----------------|
| 4 x 4 | 2,450 | 12 x 12 | 272 |
| 5 x 4 | 1,960 | 15 x 10 | 261 |
| 6 x 4 | 1,633 | 30 x 12 | 109 |
| 6 x 6 | 1,069 | 30 x 18 | 72 |
| 8 x 6 | 816 | 30 x 24 | 55 |
| 8 x 8 | 612 | 30 x 30 | 43 |
| 10 x 8 | 490 | 30 x 36 | 30 |
| 10 x 10 | 392 | 30 x 42 | 25 |

Seeds Required to Sow Garden Plots.

| | | | | | |
|--------------------------------------|-----|-----|-----|-----|--------------------|
| Asparagus, bed of 15 square yards | ... | ... | ... | ... | $\frac{3}{4}$ pt. |
| Beans, broad, per row of 80 feet | ... | ... | ... | ... | $1\frac{1}{4}$ pt. |
| Beet, row of 50 feet | ... | ... | ... | ... | 1 oz. |
| Broccoli, per 4 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Brussels sprouts, per 4 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Cabbage, bed of 8 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Carrots, drill of 120 feet | ... | ... | ... | ... | $1\frac{1}{2}$ " |
| Cauliflowr, 4 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Celery, 4 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Endive, 4 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Kale, 4 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Kidney beans, row 80 feet | ... | ... | ... | ... | $\frac{1}{2}$ pt. |
| Leek, 2 square yards | ... | ... | ... | ... | $\frac{1}{2}$ oz. |
| Lettuce, 4 square yards | ... | ... | ... | ... | $\frac{1}{4}$ " |
| Onions, 9 square yards | ... | ... | ... | ... | 1 " |
| Parsley, row of 100 feet | ... | ... | ... | ... | 1 " |
| Parsnips, drill of 100 feet | ... | ... | ... | ... | 1 " |
| Peas, row of 60 feet | ... | ... | ... | ... | 1 pt. |
| Potatoes, row of 80 feet | ... | ... | ... | ... | $\frac{1}{2}$ pk. |
| Radishes, 4 square yards | ... | ... | ... | ... | 1 oz. |
| Savoy, 4 square yards | ... | ... | ... | ... | $\frac{1}{2}$ " |
| Spinach | ... | ... | ... | ... | 1 " |
| Turnip, 6 yards square | ... | ... | ... | ... | 1 " |

Table showing the number of yards over which
1 lb. of Artificial Manure is required to be
sown to equal 1 cwt. to the statute acre.

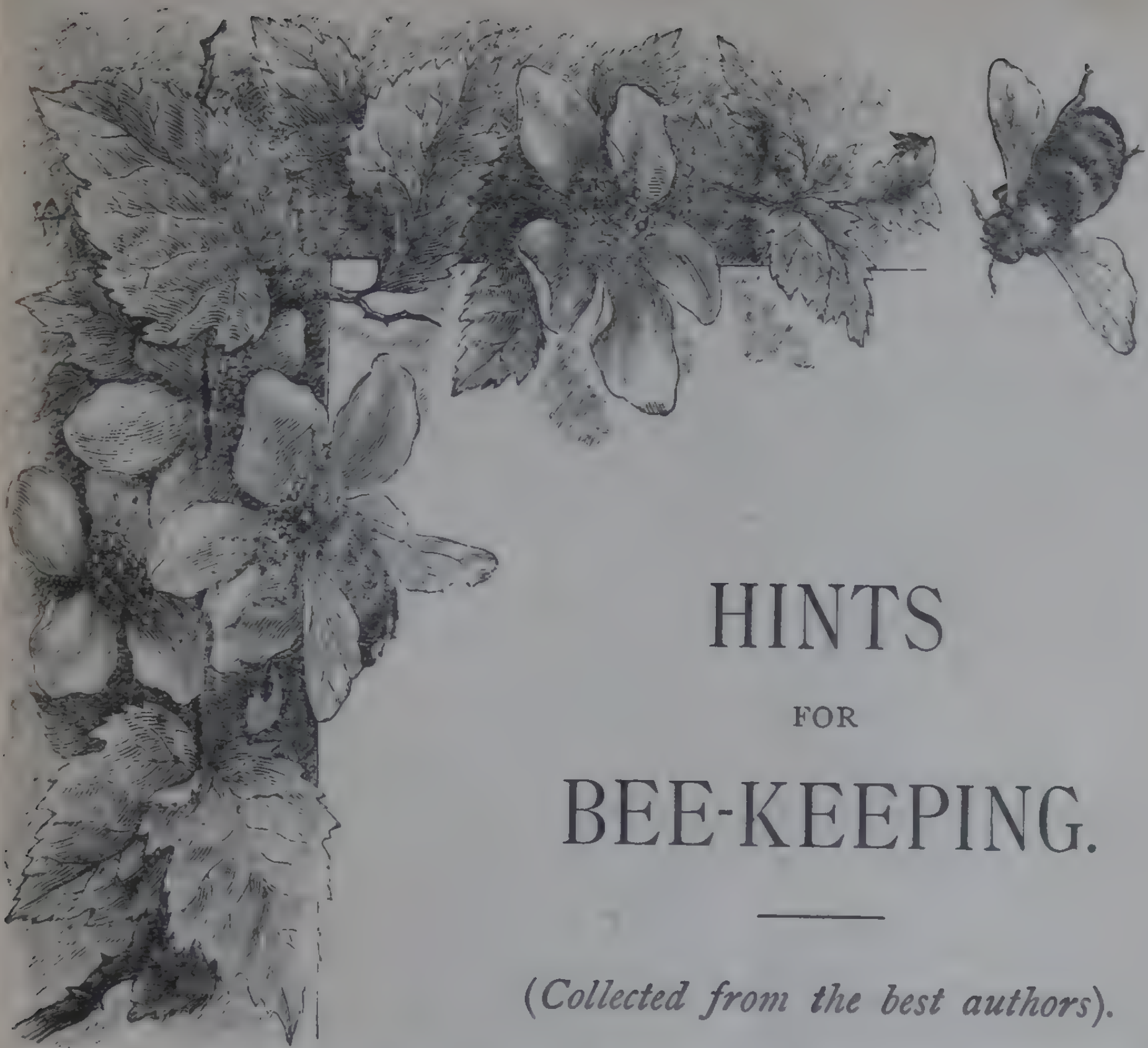
| Distance of drills in in. apart. | No. of Lineal yards in the statute acre. | Lengths of yards for 1 lb. of Manure, to equal 1 cwt. per statute acre. | Distance of drills in in. apart. | No. of Lineal yards in the statute acre. | Lengths of yards for 1 lb. of Manure, to equal 1 cwt. per statute acre. |
|--|--|---|--|--|---|
| 36 | 4,840 | 43 | 28 | 6,222 | 55 |
| 35 | 4,978 | 44 | 27 | 6,453 | 57 |
| 34 | 5,124 | 45 | 26 | 6,701 | 59 |
| 33 | 5,280 | 47 | 25 | 6,969 | 62 |
| 32 | 5,445 | 48 | 24 | 7,260 | 64 |
| 31 | 5,620 | 50 | 23 | 7,575 | 67 |
| 30 | 5,808 | 51 | 22 | 7,920 | 70 |
| 29 | 6,008 | 54 | | | |

EXAMPLE.—Suppose the drills to be 36 inches apart—1 lb. of manure to 43 yards is equal to 1 cwt. per acre ; 2 lbs. to 43 yards is equal to 2 cwt. per acre ; and so on, every pound for 43 yards being equal to 1 cwt. per acre.

Wholesale Current Prices of Flower Pots
in Christchurch.

| Size. | Price per Doz. | Size. | Price per Doz. |
|---------|----------------|---------|----------------|
| Inches. | s. d. | Inches. | s. d. |
| 2 x 2 | 10 | 8 x 8 | 5 6 |
| 2½ x 2½ | 10 | 9 x 9 | 8 0 |
| 3 x 3 | 1 0 | 10 x 10 | 10 0 |
| 4 x 4 | 1 6 | 12 x 12 | 16 0 |
| 5 x 5 | 2 3 | 14 x 14 | 36 0 |
| 6 x 6 | 3 0 | 16 x 16 | 48 0 |
| 7 x 7 | 4 0 | 18 x 18 | 72 0 |





HINTS FOR BEE-KEEPING.

(Collected from the best authors).

BEE-KEEPING should be a profitable investment in New Zealand. We do not know of any country where there are so few drawbacks to bee-keeping. In America, where the industry is largely pursued, the drawbacks are numerous, especially in the northern territories, where the stocks have to be stored away for the Winter and the bees have to be fed. We are not troubled with ants, as in Australia and elsewhere. We have a mild and open Winter, the country abounds with clover and other honey-producing plants. In fact we have all the conditions naturally which have to be provided by artificial means in other countries; so that if bee-keeping pays as it assuredly does in such countries, how much better should it pay in New Zealand.

History informs us that the ancient Egyptians of the Nile had floating bee-houses, designed to take advantage of the honey harvest. They were warned when it was time to return home by the depth to which the boat sank in the water under the weight of the cargo of honey. That the bees might not be lost, they were obliged to journey during the night-time. Bee-houses, instead of single stands, may

become popular ; but many use inferior structures, which prevent the bees from being properly handled. You must for want of room operate in front of the hives, and thus obstruct the bees and make them irritable and hard to be managed. With the strides bee-culture is making there is a growing desire to house all hives, as it lessens labour and preserves them longer than when kept in the open air. People commencing with small capital must adopt the outdoor system. They cannot indulge in dear hives, much less costly houses, until such times as the sales of honey and bees will furnish needful capital for this necessary outlay. In erecting any form of bee-house we should have good room at the back of all hives to feed, examine, and overhaul the apiary. It should be provided with a hinged shutter to allow bees to escape by. The room thus left will hold the necessary appliances when not in use.

Moving Hives.—No branch of bee culture is fraught with so many mishaps as moving bees unwisely. Bees fly for their stores a mile or two, and in times of scarcity three miles may be reckoned as within the limits of their pasturage. After a bee has fixed his locality, he starts out in the morning and never stops to take the points. If you have moved his hive about a yard or so it makes no difference, as he will soon find it out ; but if you have moved it a mile, half a mile, or quarter-mile, all of a sudden, he will never find it out, as he invariably returns to his old locality. On reaching there, and finding his hive gone, he is lost and helpless, and will never find it again. People imagine that they can move their hives anywhere and everywhere, and new hands move their hives together at the approach of Winter that they may better protect them. All goes very well until we have a fine, warm day. Then the bees start out for a fly, and return to their home just as they had been doing all the Summer. They fly about, get into the wrong hives, get stung, the whole apiary becomes mixed up, a general *melée* ensues, which ends in almost total destruction. Moving hives during the working season will cause a loss of more or less bees as well as honey. Natural swarms will remain where put up, as they depend very much on the surrounding objects in taking their points. Several hives can be moved successfully

if we maintain their position in the apiary, and carefully preserve their respective positions with reference to each other. Where the new position is outside the radius of flight—that is, about two miles, they can be moved at any time. If bees are sent long distances, they must be furnished with old, tough combs, otherwise no combs at all, as newly made combs on foundation are nice to look at, but surely break down in transit, and combs and bees at the end of the journey will be found to consist of one smothered mass of moving insects that survive but a few hours after arrival. Skeps will be found most convenient for sending swarms in. They should be covered over with sacking of coarse, open texture, and carried with mouth upwards.

Adding Supers. — Surplus comb-honey in all its attractive forms occupies a portion of the bee-keeper's fancy. He now finds to his cost that hives without some arrangement for securing pure honey, whether in large glasses placed on the top, or in supers consisting of a crate of sections, is quite worthless. He must, therefore, provide some means of supering in advance, otherwise, his bees for want of additional space will swarm off. In placing crates over the frames we must be careful not to crush the bees. Carefully note that the quilt may be turned back, beginning at either end of the frame, but not parallel with them. As soon as we have a few inches of the quilt free, slide on the crate, making sure to turn back the quilt as we slide the crate; thus, when the quilt is removed, the crate or super is in exact position, without a single bee hurt or crushed; but before you are about to perform the operation give the hive a few puffs of smoke. This will prevent their flying about during the operation, which must be as near noonday as possible; for then the bees will be abroad, foraging in the fields, and you have a less number to deal with than if you went to work at sundown. You can super your hives by placing a new hive over the old one. If you have a hole in the old one, give it a few puffs of smoke and commence a gentle tapping, when all will ascend and work with vigour instead of hanging out idly for weeks. If you have not already a hole in the old skep, make one with a sharp knife. The affair requires to be cased round and made air-tight to

conserve the heat. People can super their bees when their hives are full of comb, and bees adhering to both sides of the frames.

Transferring Bees.—The bee-keeper's great friend is smoke, as by its use the bees may at any time be terrified into submission ; and for this purpose we procure an instrument called a smoker, which consists of a miniature bellows, fire box to hold the fuel, and a nozzle through which the smoke issues to terrify the bees by its introduction into their hive. This can be purchased complete for a few shillings, and when filled with pieces of corduroy or carpet it will smoulder without blazing, and thus produce the desired effect. The hive or hives from which the bees are to be driven for the purpose of uniting and transferring must first of all be given a few puffs of smoke and tapped gently for the space of five minutes ; after which time the hive may be lifted off its floor board, replaced with an empty skep, and carried away about ten perches, inverted in a bucket or small barrel, with an empty hive over it. The two hives are now mouth to mouth, but to make the enclosures more complete and prevent the escape of a single bee, tie a cloth or piece of calico round the junction. Commence tapping the lower or full hive with two sticks ; the bees will be completely confounded, rushing about the combs, eagerly seeking some means of escape, then ascend into the upper or empty hive, making a roaring noise, which aids the operation very much. In about ten minutes the bees will have left their former dwelling and taken possession of the upper hive.

Having proceeded thus far, we carry the hive full of combs into an outhouse with an open window, in order that the few stragglers may have a means of exit. We now place the bees on their former stand, and proceed in like manner until we have gone over the lots to be saved, united, and transferred. Open driving is another method, but as we want to get over the job quickly, close driving is best. Whenever the bees threaten to get angry during the operation, administer a little more smoke. It will quiet without harming them.

Mistakes in Bee-keeping.—P. C. Dempsey, an experienced Canadian bee-keeper, writes on mistakes in bee-keeping :—

1. It is a mistake to invest very largely in any business that you are not acquainted with. Better to post yourself thoroughly before commencing.

2. It is a mistake to invest in bees that are in a box or old log hives.

3. It is a mistake to reject a good moveable frame-hive because it costs a little more cash.

4. It is a mistake to take them direct from their Winter quarters and remove them long distances.

5. It is a mistake not to let them have an excursion on the wing before moving to another place.

6. It is a mistake not to examine them immediately, and ascertain if the supply of rations is about exhausted, and, if so, to supply them at once with honey or a substitute.

7. It is a mistake, if there is no brood found in the hive, not to unite them with another that is weak, but having brood, if a queen cannot be produced.

8. It is a mistake not to have your colonies strong at all seasons of the year.

9. It is a mistake to use up all the pots, kettles, pans, spoons, stove hooks, and other things, upon which to play the dead march when a swarm has started on an excursion to the groves.

10. It is a mistake to neglect to put on supers early enough in the Spring, if comb honey is required. The bees sometimes fill the cells with honey that is required for breeding purposes.

11. It is a mistake not to use foundation comb. By its use we can always depend upon straight combs and greater convenience for handling.

12. It is a mistake to neglect to remove all full boxes or sections as soon as properly sealed. Bees sometimes soil them by travelling over with dirty feet.

13. It is a mistake not to supply an abundance of space for them to store their surplus when honey is plentiful. Bees often remain idle for want of space to store their treasure.

14. It is a mistake to extract or take honey from the bees too late in the season without supplying them with more. It looks cruel to rob and then leave them to starve.

15. It is a mistake not to examine all the colonies early in March. Those that are queenless should be supplied at once, and those that have not honey enough to carry them through the Winter should be fed without delay.

16. It is a mistake to put off feeding until the nights become cold. Better to be done too early than too late. In New Zealand bees rarely require feeding.

17. It is a mistake to visit the bees too often during the Winter. It is apt to disturb them; they become restless, and sometimes discharge their fæces, and by this means produce a stench that is enough to destroy them. Better have their Winter quarters so constructed that we can ascertain their condition without disturbing them.

Things to Know.—Every beginner at bee-keeping should know and remember :—

1. That the life of a worker bee during the working season is only from six to eight weeks duration, and that a majority of them never live to see seven weeks.

2. That a worker is from five to six days old before it comes out of the hive for the first time to take an airing; and that it is from fourteen to sixteen days old before it begins to gather either pollen or honey.

3. That all swarms engaged in building comb, when they have not a fertile queen, build only drone comb, and that all the comb in the lower or breeding apartment should be worker or brood comb, except a very small quantity of drone comb, four inches square being amply sufficient.

4. That the more prolific the queen is the more young bees you have, and the more surplus honey will be gathered, other things being equal.

5. That you ought never to cut mouldy combs out of the hives, for the reason that you should never allow it to become mouldy.

6. That you ought never to double swarms or stocks of bees in the Autumn, because you ought to attend to that and make them strong during the Summer, by taking brood from the strong stock and giving it to the weaker.

Bee Veil.—If you are afraid of bees, you must use a veil, made as follows :—A piece of mosquito netting a yard and one-quarter by three-quarters or five-eighths of a yard, should be sewn together, with an elastic on one end to be adjusted over the hat crown. At a suitable distance from the bottom attach a narrow tape to tie about the neck.

DISEASES AND PESTS OF BEES.

Foul Brood and Its Treatment.* — Since the formation of the British Bee-keepers' Association twenty-one years ago, the art of bee-keeping has made continued and steady progress. The Association was established for the purpose of advocating the more humane treatment of the honey-bee, and for bettering the condition of the cottagers of the country and of the rural population generally. Under its fostering care the pursuit has been raised from a mere amusement indulged in by a few amateurs or cottagers to an important industry, by means of which many persons have been able to add considerably to their incomes. It is safe to say that owing to modern methods of management now prevailing, the amount of honey raised can be estimated at a hundredweight for every pound produced twenty years ago.

The Royal Agricultural Society has done much to encourage bee-keeping, and the bee department at its annual Shows has uniformly attracted a considerable amount of public attention and interest.

Amongst the minor industries connected with agriculture, there are few more interesting or more capable of profitable

* By THOS. WM. COWAN, Penleaze, Fowey, Cornwall, in *Journal of Royal Agricultural Society of England*, Vol. VI., pt. 4, 1895.

development than bee-keeping. In fact it may be safely said that, if properly managed, few, if any of our minor industries can be made so generally remunerative. In time of acute agricultural depression the attention of our small farmers, and indeed of all who derive their income from the land, must be turned to such minor industries or branches of *petite culture* in the same way as on the Continent, otherwise we shall be left behind in the race of competition.

The imports of foreign honey into the United Kingdom are very considerable, sometimes reaching the value of nine or ten thousand pounds sterling in one month. The imported article as a rule, however, bears no comparison with the superior quality of the honey raised in this country; but as the former is frequently sold as British honey, a serious injury is inflicted on the British producer.

Regarding the capacity of the United Kingdom for honey production, there is pasturage at present for at least ten times as many hives as are kept.

Profitable as bee-keeping is with regard to the production of honey, the advantages which farmers derive from bees are much greater than is generally supposed. It is impossible to get perfect fruit and abundant crops without bees, consequently the indirect profit of bee-keeping in regard to our crops far exceeds the value of the products of the hive. In other words, the indirect benefits resulting to the fruit-grower far outweigh the visible results. If bees have free access to white clover in bloom, not only is the flow of honey rapid, but the effect on the crops grown for seed is still more remarkable by way of increasing the abundance of the yield of seed, compared with what it would be if only few bees were kept in the vicinity. Regarding the fertilisation of fruit, it has been ascertained by actual count that twenty times more bees than other insects visit the bloom at the time of flowering.

The benefits of bee-keeping, both direct and indirect, are admitted, and there is abundant evidence that it is capable of very great expansion, there being vast tracts of country where good bee pasturage abounds, yet where no bees are kept at all. The only visible hindrance to a rapid

expansion of the industry is the prevalence of a pestilential disease commonly known as "foul brood," which is so rapidly spreading over the country as to make bee-keeping a hazardous occupation. The bee-pest referred to has, however, received a good deal of attention of late, having been brought by the public press prominently before the country, owing to the action taken by the British Bee-keepers' Association in introducing the subject to the notice of the Board of Agriculture, with a view to legislation, and to obtaining compulsory powers for dealing with it. The *British Bee Journal* and *Bee-keepers' Record*, the two journals exclusively devoted to the interests of bee-keepers, have also kept this question constantly before their readers by repeated reference to it in leading articles, and by correspondence dealing with the subject.

Foul brood is terribly contagious ; moreover, stocks suffering from it are generally weak, and this induces bees from other hives to rob them of their honey. Thus the mischief spreads from hive to hive. It is also largely propagated by those who keep bees in straw skeps, the ignorant and the indifferent. Recently, the President of the Board of Agriculture received favourably a deputation of the British Bee-keepers' Association, who were accompanied on the occasion by an influential gathering of members of Parliament in sympathy with the movement, and there is every prospect of bee-keeping being recognised and assisted by the Government, which will no doubt give it an impetus. But until some means are devised for stamping out the disease, it is very desirable that those who keep bees should thoroughly understand the nature of foul brood, and know how to treat their stocks when attacked, and to prevent the disorder from spreading.

Historical Retrospect.—From the writings of ancient authors there seems to be no doubt that foul brood has been known for many centuries, probably since bees have been domesticated. Aristotle, after describing the ravages of the wax-moth as a disease, says :—"A second disease is a sort of inactivity that attacks the bees ; the hives then contract a bad smell." This inactivity of bees and bad smell are well

known as indications of foul brood, and it is more than probable that it was by these outward signs only that disease was recognised by the ancients. We may also safely suppose that our forefathers, who lived thousands of years ago, examined the interior of their hives just as seldom as do our skeppists of the present day. Although Aristotle mentions the fact of the disease, and says, "The bees are liable to become diseased when the flowers on which they work are attacked by blight," he suggests no remedy.

Coming down to a later period, we find Schirach, in 1769, describing the disease and actually calling it "foul brood"—"a veritable pest." He suggested two causes which lead to it, viz., bad food, on which the larvæ are fed; and misplacement of the larvæ, so that they are not able to develop. As a remedy, he advises the combs to be removed and the bees allowed to fast for forty-eight hours, after which they can be introduced on to clean new combs, and fed on syrup prepared with sugar and wine, flavoured with nutmeg. Thus we have given us nearly 130 years ago a method of cure almost identical with what is by some claimed as new to-day.

In 1790, Della Rocca, in his *Traité complet sur les abeilles*, describes very minutely an epidemic of foul brood which destroyed the apiaries in the Island of Syra in the years 1777 to 1780, and says "Some pestilential blight had without doubt corrupted the honey and the dust from the anthers." He also recommends starvation as a cure.

Since that time many noted scientists and bee-keepers have experimented with the same disease, and various theories have been advanced with respect to its origin, the favourite one being that the disease was propagated by the honey, and that if this were removed and the bees starved until they had consumed what they had taken into their stomachs, and started afresh, foul brood would be got rid of. However, the disease, even in the hands of the most experienced, broke out again, and, as an instance, it may be mentioned that Dr. Dzierzon, of Carlsmarkt, in Silesia, who pursued this treatment, lost as many as 500 colonies through foul brood. Although Dzierzon, Berlepsch, Fischer, Lambrecht, Cech, and other leading men in

Germany were for years investigating the disease, it was not until 1870 that a real ray of light began to shine upon the subject, and that scientists were able to show why the starvation method and other attempted cures had failed.

We are indebted to Dr. Preuss, of Dirshau, in Prussia for the first "light" just referred to. After examining foul brood microscopically, he at once pronounced it to be a germ disease, which he declared was due to the presence of a microbe known as "micrococcus." He also said that if this could be destroyed the disease could be cured.

Of course this announcement of Dr. Preuss was received with some derision by bee-keepers, but Pastor Schönfeld determined upon experimenting for himself. He infected several hives, and when foul brood in a virulent form had developed therein, he took a comb of rotten brood to the Physiological Institute at Breslau, and had it submitted to a microscopical examination by Dr. Cohn and Dr. Eidam. Dr. Cohn soon found the "micrococci" of Preuss, and amongst these a number of rods, some singly and others connected together, which he at once pronounced to belong to the genus *Bacillus*. Not only was this found subsequently to be correct, but it was also now understood that what were taken for micrococci were really the spores of bacilli. Many of our readers may remember that very little was known about bacteria and disease germs in 1870, so it is not surprising that Preuss should have mistaken for micrococci what we now know to be the spores of a bacillus.

The discovery of Dr. Preuss led to experiments being carried out with various suggested remedies, and in 1873 Professor Boutleroff, of St. Petersburg, published the results of his treatment of the disease with phenol, in the proportion of 1 of pure phenol to 600 of honey. Others tried thymol, and in 1875 Hilbert—whose apiary was affected with foul brood in its worst form—published the results of his experiments with salicylic acid. He gave this a severe test, and, after many failures, eventually discovered a method by means of which he effectually got rid of the disease from his apiary.

In 1883 the late Mr. Cheshire and Mr. Watson Cheyne conjointly carried out experiments at the laboratory of the

latter gentleman, and by their investigations confirmed the discovery of Dr. Cohn that the germ causing the disease was a bacillus, to which Mr. Cheshire gave the name of *Bacillus alvei*. In Germany it was known by the name of *Bacillus alveolaris*.

Since that time various experiments have been made and numerous remedies more or less effectual have had their advocates, but owing to carelessness, want of knowledge, and, in many cases, the impossibility of making people realise the infectious character of the disease — or the necessity for disinfection—foul brood, like a dark cloud, is spreading over the country.

The Nature of Foul Brood.—It was at one time supposed that only the brood or larvæ were attacked by the disease, hence the name “foul brood.” But Hilbert’s investigations in 1875 enabled him to state that it was not only a disease of the brood, but that the mature bees—sometimes including the queen—were liable to be affected by it. In consequence of this the disease is sometimes called “Bee-pest.”

In a healthy hive the brood in the combs lies in compact masses, and the larvæ are plump, of a pearly whiteness, and when quite young lie curled up at the bottom of the cells much in the form of a C. When a hive is attacked and the disease begins to develop, the affected larva commences to move unnaturally: instead of lying curled up, and being plump in appearance, it becomes extended horizontally in the cell and has a flabby aspect which indicates death. The beautiful pearly whiteness of the healthy larva now changes to a pale yellow colour, afterwards turning to brown; then the dead larva begins to decompose. Although bees remove ordinary chilled or dead brood from the hive, they do not usually attempt to carry out that which has died from disease, except under conditions which we shall presently mention. As a consequence, the decomposing larva eventually shrivels up and nothing remains but a dry brown scale, which adheres to the side of the cell.

We would here note that chilled brood should not be mistaken—as it very often is—for foul brood. In the



THE POULTRY YARD.

SYSTEMATIC fowl farming has not as yet received much attention in New Zealand. Attempts, it is true, have been made with varying success. To succeed with a fowl farm every detail must be attended to with persevering industry and attention. The leading parts to be attended to are regularity in feeding, scrupulous cleanliness, and pure water. If these conditions be neglected, disease is sure to attack the flock. Fowl cholera is occasionally prevalent in this country; we have known it to sweep away 90 per cent. of the whole stock of fowls on a farm in the course of eight or ten days. There is little doubt but that neglect in some of the above particulars is the main cause of such mortality.

Soil for a Fowl Farm.—In selecting a site for a fowl farm choose a dry warm soil, not too poor or too gravelly, as a portion of the land will have to be cropped to produce green and corn food. In America, where fowl

farming is carried on on a large scale, the houses are made moveable, the runs are fenced in with wire so that the whole can be removed each year, and the lately-occupied portions are cropped. Those who are desirous of going in for the business of fowl farming will do well to procure a standard work on the subject, and work to it always, taking surrounding circumstances into consideration.

No homestead should be without a few fowls, which if well managed should be a considerable source of profit. A dozen or fifteen well-selected and well-fed young fowls will supply eggs for a family of twelve persons throughout the year. It is a difficult thing to advise as to the best breed of fowls to keep, combining excellence as layers, and as table birds. For general purposes most authorities agree that the Grey Dorkings and Shanghaes will give quite as good a return for the care bestowed on them as any other breed. The Dorkings are fine Summer layers, while the Shanghaes excel as Winter layers. The Dorkings are best as early Spring sitters, mothering the chickens for a much longer period than most fowls.

The following crosses have been proved to answer admirably for producing ordinary fowls—A cross between the Dorking and Game hen produces a plump table fowl and a good layer; the cross with a Brahma cock and Leghorn hen are unsurpassed as layers, and fairly good table fowls; the cross between the Dorking and Brahma are better table fowls, but not so good for laying. The Langshans are also grand fowls for table and Winter eggs, but are not ready so early for table as Wyandottes or Dorkings.

Breeds.—There has been a vast improvement in the breeds of fowls during the last few years. The various breeds may be classed as follows:—

British breeds, viz. :—Dorking, Game, Cornish Game, Redcaps, Scotch Greys, and Hamburgs.

French breeds, viz.:—Houdans, Crevecœur, La Fleche, etc.

Mediterranean breeds, viz.:—Spanish, Minorca, Andalusians, and Leghorns.

Asiatic breeds, viz. : — Brahmas, Cochins, Malay and Langshans.

American breeds, viz. : — Dominique and Wyanddotte, Plymouth Rock, and other varieties, as Polish, Shinowarapas, and Japanese Bantams.

The merits or otherwise of any of the above breeds is a matter which must largely be regulated by circumstances.

The following experiment recently tried in England with a view to determine the consumption and profit of different breeds of poultry is suggestive ; the following is the result :—

| | | | | |
|----------------|-----|-----|----------|-------------|
| Dorkings | ... | ... | 6 ounces | 391 grains. |
| Games | ... | ... | 4 do. | 275 do. |
| Buff Cochins | ... | ... | 17 do. | 296 do. |
| Langshans | ... | ... | 7 do. | 31 do. |
| Dominiques | ... | ... | 4 do. | 336 do. |
| Brown Leghorns | ... | ... | 4 do. | 398 do. |
| Hamburghs | ... | ... | 4 do. | 120 do. |
| Polish | ... | ... | 4 do. | 28 do. |
| Guinea Fowls | ... | ... | 4 do. | 182 do. |

It will be seen that the Buff Cochins ate much more than any other breeds ; and to show the increase of weight in proportion to food consumed, it may be stated that each gained daily as follows for twenty days :—

| | | | |
|----------------|-----|---------------------|--------------------|
| Dorkings | ... | 138 grains and laid | 130 eggs per year. |
| Games | ... | 92 do. | 100 do. |
| Buff Cochins | ... | 77 do. | 115 do. |
| Langshans | ... | 123 do. | 115 do. |
| Dominiques | ... | 92 do. | 110 do. |
| Brown Leghorns | ... | 107 do. | 190 do. |
| Hamburgs | ... | 92 do. | 239 do. |
| Polish | ... | 46 do. | 98 do. |
| Guineas | ... | ... | 75 do. |

It will be noticed that the Hamburghs gave the largest number of eggs, and the Brown Leghorns next, but the Dorkings and Langshans made the largest daily gain in growth ; while the Cochins, though consuming enormously of food, did not show its effects either in eggs or the first

twenty days' growth. Taking the three highest for weight at six months, the following was the result :—

Dorkings weighed 10 lb. 1 oz. and 685 grs.

Buff Cochins weighed 9 lb. 13½ oz.

Langshans weighed 10 lb. 5 oz. and 437 grs.

The greatest gain was made by the Langshans, but for the food allowed the Dorkings are entitled to the honour.

Feeding.—Fowls confined to runs must have a regular supply of soft food once a day, consisting of scalded meal and refuse meat, boiled and chopped fine. This should be fed in troughs constructed so that the fowls cannot get their feet into them. They should have a daily supply of cabbage leaves, turnip tops or grass. The other feeding may consist of wheat, which will produce more eggs and of better quality than any other kind of grain. The grain, at least some of it, should be scattered about the enclosure, which will give the fowls employment seeking for it. The quantity of food required for each fowl is what each one will consume at a meal without waste.

Eggs.—The production of eggs must be the main object in keeping fowls, to keep up a regular supply of which young hens must be constantly coming forward, the hatching of which produces a large percentage of cocks; and the hens which have passed their prime will furnish a regular supply of birds for fattening for the market.

To fatten Fowls.—Prepare a coop. A box three feet high, two feet wide, and four feet long, will hold half-a-dozen good-sized fowls, which should not be more than six months old. The front of the box must be constructed of bars three inches apart; the bottom should be of bars two inches apart. A shelf must be placed outside the front to hold the food boxes and water. Crushed barley, wheat, or oats, with scraps of cooked meat and a little dripping, will be the best food for fattening. A little and often is the best system. The coop must be well sheltered, and the fowls should be kept in partial darkness between the meals. If well attended to, they will be ready

for the table in ten or twelve days. A constant supply can be kept up by putting in a pair for every pair killed.

The possible profits from Fowl Raising.—The following particulars of twelve months' work have been furnished by a party residing at Christchurch who keeps a few fowls in a systematic manner :—Commenced in September with 10 hens and 1 cock, a cross between a pure Dorking and Game hens.

| | | | | | £ | s. | d. |
|---|-----|-----|-----|-----|---------------------|----|----|
| Sept. 1—Dec. 31, Food | ... | ... | ... | ... | 0 | 15 | 0 |
| Jan. 1—July 31, „ | ... | ... | ... | ... | 4 | 2 | 5 |
| | | | | | <hr/> £4 17 5 <hr/> | | |
| Fowls and eggs sold from Jan. 1—July 31 | | | | | 5 | 12 | 4 |
| On hand { 26 Pullets, value... | ... | ... | ... | ... | 2 | 12 | 0 |
| { 7 Roosters | ... | ... | ... | ... | 0 | 14 | 0 |
| { 12 Bushels wheat at 2s.... | ... | ... | ... | ... | 1 | 4 | 0 |
| | | | | | <hr/> | | |
| | | | | | 10 | 2 | 4 |
| Less food | ... | ... | ... | ... | 4 | 17 | 5 |
| | | | | | <hr/> | | |
| | | | | | 5 | 4 | 11 |
| | | | | | <hr/> | | |
| 13 Chickens | ... | ... | ... | ... | 0 | 3 | 0 |
| 4 lb. Feathers | ... | ... | ... | ... | 0 | 8 | 0 |
| Profit on eggs—August—say | ... | ... | ... | ... | 1 | 0 | 0 |
| Eggs on hand | ... | ... | ... | ... | 0 | 5 | 0 |
| | | | | | <hr/> | | |
| | | | | | <hr/> £7 0 11 <hr/> | | |

“P.S.—I reared 58 chickens and have the old stock still on hand. I may also add that results such as I have achieved are only to be obtained by the utmost attention to the following points :—Scrupulous cleanliness, regularity in feeding, and a supply of pure water, and daily exercise in a paddock or grass plot. Fowls will not produce such results if kept constantly in their runs.”

A FEW RULES FOR NOVICES GLEANED FROM THE BEST AUTHORS.

If you begin by purchasing eggs for hatching, order them from some reliable breeder in your own locality, and thus save the perils incident to their transportation a long distance.

Before hazarding your (it may be) valuable eggs, be certain that the hen is really broody. You may give her one or two worthless eggs as a trial, or if you are anxious not to lose time divide your setting between two or more hens, and if one prove truant at the end of a few days, give all to another.

By setting several hens at the same time you have the great advantage of being able to put all the chickens, as soon as they are hatched, under one, and of adding new comers to her flock. Eggs sometimes hatch irregularly, and unless some such system were established, the earliest hatched chicken would die of starvation before the whole were brought out.

In selecting eggs for setting choose the freshest, of moderate size, well-shaped, and having the air vessel distinctly marked, either in the centre of the top of the egg or slightly to the side.

Sitting hens brought from a distance should be carried in a basket, covered over with a cloth, never with the head downwards, as is too often seen, at the risk of suffocation, and the certain dissipation of their maternal dreams.

Brahmas and Cochins are excellent sitters, but Dorkings occasionally rebel and refuse to sit, unless in their own way. When they are very reliable, they are excellent mothers. You must be very gentle with them, and try by kindness to induce them to take to the nest selected.

Pullets are less to be trusted as sitters than more mature hens, and (being rather erratic in their dispositions) are not very careful mothers. Artificial incubators are now extensively used, and where there is a command of gas they

are easily managed. The natural mother is, however, preferable where only a limited number of fowls is kept, as should some prove faithless, others will be found to take their place.

Always set your hens of an evening, and not in daylight. They will be more sure to stick to the nest ; and for two or three days at first be careful that they are undisturbed.

If you can make your nest on the ground, do so ; if not place a fresh-cut grass sod at the bottom of your box, and sprinkle sulphur or coarse snuff into it to keep off vermin.

Scatter powdered sulphur through the hen's underfeathers, also during the period of setting. She must be kept free from lice. This is good for her comfort as well as the chickens.

Remove your hen daily, let her roll in the dust-box near by ; feed and water regularly, see that she goes back before the eggs chill, and cover her sitting-box with coarse bagging if she seems half inclined to give up her work.

On the twenty-first day, when the chickens are coming out, leave her to herself until all are released. Then wait twenty-four hours for the little ones to get on their feet. Then clear the nest out nicely.

Apply a little sulphur upon the down and under each wing of the chicks as soon as they emerge from the nest. Keep mother and brood thus free from vermin. Give them food when a day old, and keep them dry and warm.

Commence feeding with soaked bread, crumbs, rice, and hard-boiled eggs. Follow this up for a week, then cooked soft food and broken wheat ; then chopped meat, or scraps, and plenty of green food.

Give the young ones sunshine—all you can command. If cold when hatched, look out for the harsh winds. Give dry shelter till weather is warm, and save them from rain and storms.

The growing fowls should have ample range over the pastures. Fowls will not thrive so well, no matter what attention they may receive, if kept constantly confined in

their runs. If you have no grass-plots, let your runs be of a dry gravelly bottom, and give them cabbage leaves, turnip tops, &c., and cooked meat daily with their dry grain food.

Always supply young and old fowls with plenty of fresh clean water. Into this drop a little cayenne pepper tea, a prime tonic, as well as a preventive of gapes in chickens.

To "cure roup," look out that it doesn't get started in your flocks. It is helped by colds, dampness, exposure to rough weather, and neglect. Prevent its presence by constant care, good shelter, and dry, clean hen-houses.

Wash your roosts occasionally with spirits of turpentine or kerosene. This prevents the accumulation of lice in the poultry-houses, and the fumes of this pungent oil permeate the feathers of your fowls at night, and drive the vermin from their bodies.

Permit all your hens so inclined to sit and hatch one brood in the year. It is better for the fowls, and you will thus get just as many eggs from them in twelve months as if you bothered your brains "to break them up."

If you commence with fowls (instead of eggs), buy of reliable men, who know what you want, and who will deal honourably with you. Pay such a man his price—get good stock, of whatever variety it may be, and take care of it after you get it.

Keep but one kind at first, of whatever kind you may fancy. When you can breed that well, try something else if you get tired of this; but don't venture upon too much in the "variety line" at the commencement, or you will fail with all.

Don't attempt to raise five hundred birds within limits fitting the needs of five dozen or less. Crowding fowls into close quarters will breed thousands of lice, but precious few chickens, remember.

Select the best of your progeny for breeds. Sell your patrons, what you have to sell, honestly. If you dispose of eggs, send off fresh ones, and pack them carefully.

DUCKS.

There are several varieties of ducks, but the two breeds best adapted for general purposes are the Rouen and the Aylesbury. The former is a dark plumaged bird, while the latter is generally pure white. The average weight of these birds should be six pounds for the drakes, and five pounds for the ducks. Rouen ducks are grand table birds: they will thrive with less water to swim in than any of the other breeds. They are fairly good layers, beginning to lay early in Spring, and continuing to do so for a couple or three months. Ducklings hatched out in October, will, if well cared for, commence to lay in March, and lay on till May; the eggs weigh $3\frac{1}{4}$ ozs. The Aylesbury Duck is a good layer, and is a better setter than the Rouen; they have been known to lay 150 eggs in the year, averaging 3 ozs. each.

The Duck-house.—Ducks should never be housed with poultry, but should have a house to themselves. The floor of which should be of brick, in order that it may be frequently washed out. The crowding of ducks in their sleeping department is as objectionable as it is in the case of fowls, being productive of vermin and disease. The duck-house should be washed out at least once a week.

Feed.—Boiled potatoes and turnips mixed with a little barleymeal or pollard is the most suitable food for ducks, together with what they can pick up when liberated, as they should be for a few hours each day.

Sitting Ducks.—The nest should be made on the ground, in a cool retired spot. A dozen eggs will not be too many to place under a large duck. The duck while sitting must be supplied with fresh food twice a day, morning and evening, placed within her reach. Duck eggs may also be set under hens. The ducklings will thrive best on oat-meal porridge for the first eight or ten days, when they may have barley-meal, pollard, and crushed wheat, with a plentiful supply of chopped green food. If well attended to, the young ducks should be ready for the table in about ten

weeks. They will thrive without the old duck when a fortnight old, provided they are kept in a warm house at night.

The ordinary farm-yard duck is a nondescript, so far as breeding is concerned. They are, however, excellent layers, good sitters, and make nice plump birds for the table. They require access to water more than either of the above described breeds do.

TURKEYS.

The Cambridge, the Norfolk and the American are the hardiest breeds. Four hens to one cock are the best proportions. The hens, if well fed, will commence to lay in August, producing from fifteen to twenty eggs. It is a good practice to place the first seven eggs under a Shanghae hen, and to allow the turkey to sit on the balance if she wants to. The turkey hen must be kept perfectly quiet while sitting, as they are timid. October is the best time for setting turkeys. The young birds are very delicate, and require a large amount of attention until they are quite two months old, and must be protected from cold rains during that period; in other respects they require the same attention as ordinary chickens. Hens should not exceed four years old. The cocks should be changed every two years, and should not exceed that age.

Incubators.—This artificial and expeditious method of hatching chickens is only adapted to those who have made fowl farming a business. There are many varieties of incubators, each maker claiming for his particular machine superiority over all others. They are worked by kerosene, gas, or hot water. The successful use of these machines entails unremitting attention, not only while the eggs are being hatched, but during the time the chicks are being reared. Except where fowls are required to be raised on a very large scale, the natural system (the hen) will be found to answer best.

POULTRY DISEASES.

[BY GEO. M. DUNCAN.]

Diseases of the Digestive System—I think no one will contradict me when I say that the majority of diseases that the human race is subject to are caused by disorders of the digestive system.

The same is true of poultry; and if poultry breeders paid more attention to the food of their birds, I am sure the diseases below would seldom occur.

A fowl's food is first taken into its crop, and after there being softened, or partially digested, passes on to the gizzard, where the process of digestion is completed. The fowl not being provided with teeth, can only masticate its food by means of the grit or gravel which (if available) it is constantly picking up. This grit revolves in the gizzard, and thus grinds the food. It will thus be seen that without the necessary grit, a fowl's digestive system would soon be out of order. Place a bird in a coop with a wooden floor, and feed it on grain, *without grit*, and in a short space of time it would mope, and ultimately die. A healthy fowl will consume quite a handful of gravel in a day; so it is necessary—even where the birds have a large run or yard—to place plenty of sharp gravel where they can have access to it.

Crop-bound.—*Symptoms.*—A full crop first thing in the morning (when, under ordinary circumstances, the bird's crop should be empty, all the food having digested during the night). The bird stretches and twists its neck as if trying to swallow. If not attended to, the fowl mopes, and its comb droops.

Causes.—Stoppage of the passage from the crop to the gizzard by some obstruction, such as a small bone, horsehair, string, or, as commonly happens, dry, tough grass. Impacted crop is also caused by indigestion.

Symptoms.—The bird's comb droops, first going black and later shrivels up and loses all colour; its face becomes

white and drawn, the feathers are ruffled up, and the appetite fails.

Causes.—Want of exercise, overfeeding, and want of grit.

Treatment.—Place the bird on a grass run if possible, and make it scratch for its food. Feed once a day, and cover the grain with earth so that the bird has to scratch for it. In the soft food, which should be given on alternate days, mix a little powdered charcoal and chopped onion, and the bird will soon recover.

Worms.—An eminent authority on internal parasites says that poultry are infected (or liable to be) with about sixteen varieties of worms. If the hens cease from laying and lose flesh from no apparent cause, worms may be suspected. Occasionally small oval worms, very similar to an ant's egg, may be seen in the fowls droppings.

Turpentine is one of the safest remedies, and I think it would be worth while to try areca-nut, which is the universal specific for worms in dogs.

Diarrhœa is often caused by injudicious feeding, such as turning fowls on a grass run when they have had no green food for some time. It is also caused by the bird eating soft food which has been allowed to lie about and get sour. Intestinal worms also cause diarrhœa. The chief cause of this disease, however, is impure drinking water, especially during the hot weather, when poultry drink a great deal.

To my mind the great secret in successfully rearing young stock, be they horses, cattle, sheep, or poultry, is to provide them with plenty of pure fresh water. Many poultry keepers go to no end of trouble to house their birds well and feed them systematically, but as to giving them fresh water daily, such a thing never enters their minds. I have often seen farms where the only place the poultry could find a drink was at the pigs' trough or at some puddle filled with manure.

To cure diarrhœa, remove the cause, and the rest is easy. A pill given twice a day of powdered chalk, rhubarb, and

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